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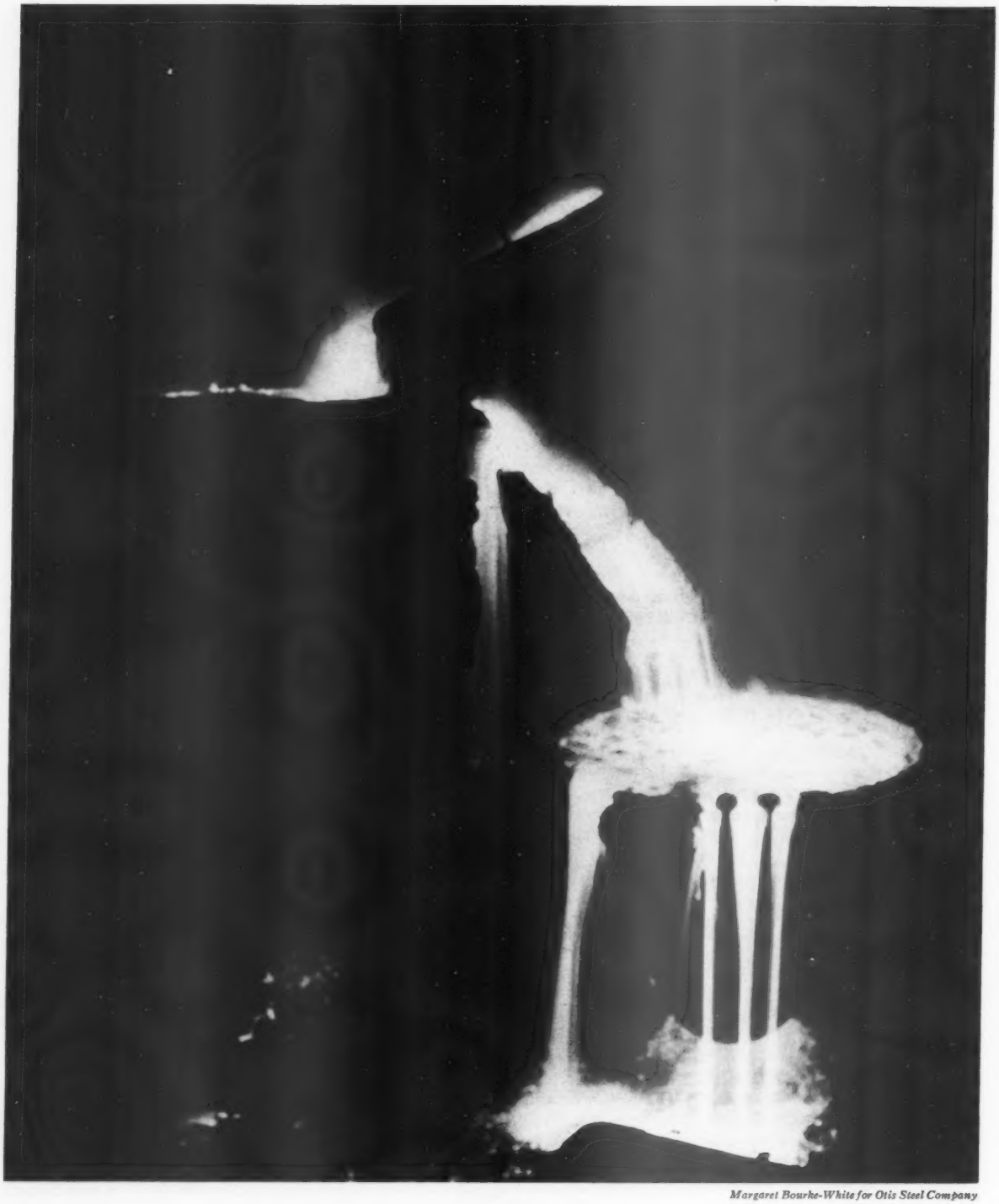


Margaret Bourke-White for Otis Steel Company

STEEL

CLASSICISTS WOULD TITLE IT "SPIRIT OF HEPHÆSTUS, GOD OF THE FORGE"

The TECHNOLOGY REVIEW

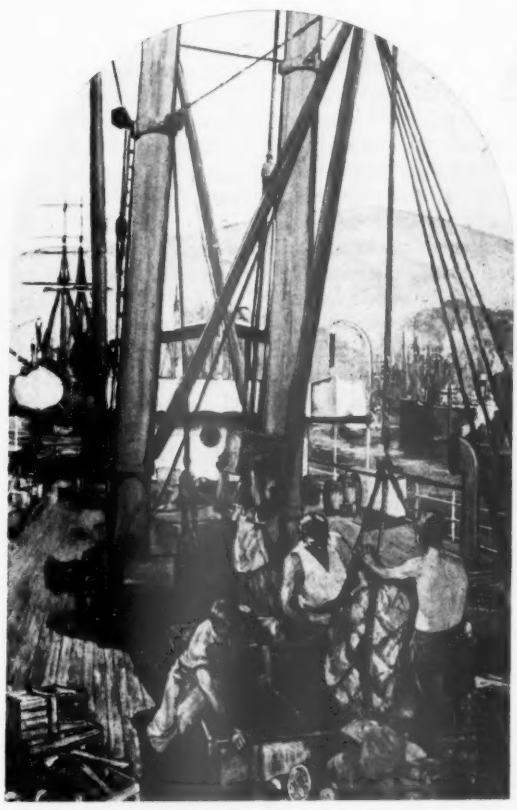
VOLUME 32 · MAY, 1930 · NUMBER 7

IS HISTORY A SCIENCE?

Henry Adams's Physics Simplified But Did Not Solve History's Problems

BY JAMES TRUSLOW ADAMS

IN NO OTHER CITY in the world are the problems of history so insistent as in Rome, and, as it chances, it is in Rome that I must comply with the request of the Editor of The Review for an article on history regarded as a science. Within a few hours I was examining the recent excavations of Etruscan remains from far below the lowest level of the oldest Roman Forum and standing in a dense mass of tens of thousands of Roman citizens of today in the Via Nazionale to watch Mussolini march in the funeral procession of the great Fascist, General Bianchi. Between that Etruscan shrine of perhaps 800 B.C. and the solemn funeral drums of the Bianchi funeral yesterday lay the whole history of our western European civilization. Historians and archaeologists, naïve or scholarly, have busied themselves with it these two thousand years past. How much more do we know, "scientifically," about it all than we did when Livy, Guicciardini, or Gibbon, centuries from each other, wrote their successive accounts of the great process? As though flashed on a screen, we see bits of the great drama in all its stages — the struggle of semi-savage or barbarian tribes in the dark shadows of history's dawn; the rise of the city to world empire, a city of marble palaces with a million inhabitants living on the tribute of Europe and Asia and Africa; the slow decline to a den of robbers, but seventeen thousand people, it has been said, fighting each other among the desolate ruins; the new splendor again of the Renaissance; the great capital of today. We feel the pulsations of some great natural process, as in the vast cycles of ice-age and temperate climates in geologic epochs. But what do we know of it all? In the rise and fall of Rome we have, so to say, a historical phenomenon on a cosmic scale. Perhaps no other has been the subject of equally prolonged research. But we know no more than our predecessors. According to predilection of preoccupation, historians may stress as causes of the fall, morals, a shift in trade routes and exchanges, exhaustion of soil, or a dozen other influences, but all mere hints, guesses, suggestions. Rome offers us classic examples of the rise and fall, rise and fall again, and rise once more of great civilizations, yet all we have concerning these fundamental historical phenomena are vast masses of data, preserved and accumulated more or less at hazard, and narratives written according to the taste and interests of the narrators. Is this sort of thing science, or can it ever become science?



"THE SHIPPING INDUSTRY IN THE HARBOR OF SAN PEDRO," A MURAL BY ALSON CLARK IN THE FIRST NATIONAL BANK OF PASADENA

Obviously before even attempting an answer we must define what we call "science," for a large part of the discussions in this world could be avoided by agreeing on terms at the outset. I do not insist upon my own definition of the term as being the only correct

one but clearly much misunderstanding can be avoided if I state what it is.

It seems to me that there is a great difference between a body of knowledge that is pursued in a scientific spirit and one which has become a science. I do not think that there is much room for dispute today over the qualities of the scientific spirit, such as accuracy, patience, exhaustive enquiry, utter disinterestedness, the searching for truth without fear or bias. But there is noticeable today a frequent tendency to confuse the qualities of the subject and the object, that is, to consider a body of knowledge which is investigated in the scientific spirit as having for that sole reason become itself a science. There are many causes for this confusion, some of which are to be found quite as much in the social as in the intellectual temper of our age, but the confusion itself does much harm.

For one thing, it tends to blind us as to method, results, and the nature of the phenomena themselves on which we are working. In the practical world men are quickly checked by results. Let us suppose, for example, that a man examines the most up-to-date machinery used in a great oil field and that he then orders a similar plant set up on an abandoned New England farm. In spite of the fact that he had all of the machinery, though no oil flowed, he would be considered crazy if he insisted that he had an oil field, and if he tried to sell stock on that basis he would quickly land in jail. There are no similar checks in the intellectual world, but the comparison is not too far-fetched, for I do believe that today many branches of knowledge are being denominated sciences merely because the scientific machinery of investigation or the scientific spirit has been set up over them, regardless as to whether there is any oil beneath.

"Striking oil" in the fields of the sciences, it seems to me, consists in establishing laws and predictability of results, that is, in discovering how things invariably happen in any chosen group of phenomena, and being able to say that if so and so occurs, so and so will result. We may be able to do this with the extreme mathematical accuracy of an astronomer, the certainty of a chemist, the somewhat looser accuracy of a biologist, but until we can do something of the sort, I do not see why we should call the particular body of knowledge we are investigating, with however exalted a scientific spirit, a science. It is merely a mass of data that by scientific methods we are trying, without success as yet, to reduce to a semblance of scientific order. The scientific spirit is absolutely essential for the task but that is not enough. Even with that spirit, there may be two reasons why we are not creating a science. In this brief article I cannot trespass on metaphysics, but one reason may be that the phenomena by their very nature are not capable of being reduced to scientific order, that is, that they form a portion of the universe not capable of being interpreted by the scientific method, useful as that tool has proved in many other portions. Or, again, it may be that while the spirit is right the particular method so far used has not been so. To call the body of knowledge a science merely because it is pursued in the scientific spirit is to blind us to both of these possibilities. We are in the position of the man who insists he has an oil field because all the machinery is set up. On the other hand, if we do not call it a science until we have "struck oil" in the sense noted above, we are apt to be much more on the lookout for possible faults in method or choice of the field of operations.

It is, however, in this sense and this sense only that history can claim to be a science today. I think it is wholly a mistaken sense for the reasons given above. That the modern historian is animated by the scientific spirit is happily true. He seeks in that spirit to know the truth and only the truth, regardless of romance or cherished prejudices and faiths. He no longer regards history as romance or drama or propaganda. He works in the same spirit over the coinage of the Antonines or the rights of a feudal manorial lord as the chemist does over the molecular construction of hydrates or the astronomer over the formation of nebulae. But this, necessary as it is for a beginning, and essential as it is to achieving scientific results, does not mean that any result has yet been attained, beyond the accumulation of a large number of studies of more or less idiosyncratic and individual phenomena here and there. So far not a single law has been found to account for events in the past, not a single advance has been made in ability to predict the future. We have a greater mass of accurate information about a greater mass of facts than ever before but these facts are as yet wholly unrelated causally. The chemist in his field of research has made enormous strides scientifically beyond the alchemist; the historian has made none beyond the statesman. A wise statesman, ignorant of "scientific" history, would probably make far more accurate predictions as to the historic process in the next decade than most scientific historians. The latter could not predict such a major movement as the Great War. They cannot yet agree on its causes. They cannot predict its results. They cannot answer one of the thousand questions that spring at me from every street corner in Rome. If a subject is a science merely because investigations in it are conducted in a scientific spirit, then history is today a science. If, on the other hand, it is not a science until at least some streaks of causal order have been found in it, some sequences isolated that are found to be dependable and universal, then assuredly history is not a science.

Most men today do not like to follow lost causes or lead forlorn hopes. They like to be on the band wagon. Moreover, faith is in the discard. Men want "certainty." The trade wind that carries men to port in our intellectual climate is science, not religion or art. To call history a science seems to make the historian more respectable. It also relieves him from a great deal of most uncomfortable self-criticism. If the output of narrative works, of monographs on minute details, of uncountable, and usually unreadable, Ph.D. theses have made history a science, then why worry? The method calls for much patience but little thought. Once learned it can be followed for a lifetime, and if the scientific spirit makes history a science, it is easy to win the best of two worlds, for we have neither to attain to the ordered knowledge and predictability of the true scientist nor to the beauty of style and composition of the artist. If the scientist complains that history is merely a story, we can tell him that he must not expect the same sort of results as in *his* science, and if the artist complains of the dry-as-dust style, we can tell him that history is a science, not an art. If, however, we admit, as I think we ought, that in spite of infinite labor, the best intentions, and the scientific spirit, history

"SCIENCE REVEALING THE TREASURES OF EARTH," A MURAL BY EDWIN A. ABBEY IN THE PENNSYLVANIA CAPITOL BUILDING

Copyright by Edwin A. Abbey and Curtis & Cameron

shows as yet no signs of becoming a genuine science, we are at once put to it to ask why? The asking of questions is the beginning of knowledge if not of wisdom.

We saw above that to create a true science three things were needful — the scientific spirit of enquiry, a proper method, and a mass of data that proved susceptible of being correlated under laws. If we admit that modern historians have the scientific spirit but have not succeeded in producing a science, we may look for the trouble in the other two factors. Are historians using the right method and is the mass of data with which they busy themselves susceptible of being arranged in ordered sequences in which they shall invariably bear any causal or other predictable relation to one another? The two points are closely related for the delimiting of a field of enquiry is in itself a first step in method.

EACH and every science has chosen a special field with which it has concerned itself to the almost complete exclusion of every other aspect of the data involved. One of the most interesting developments of the present day is the tendency of these fields to intersect and overlap, and the problems of the future will be far more complex than those of the past, but this does not invalidate the necessity for each science to delimit sharply the field in which primarily it shall work, one might almost say the particular "layer" of reality or experience. The field of history, as worked at present, differs from other fields in two marked points, in a sense contradictory to one another: its lack of limitation and its very narrow limitation. As to the first, history has taken as its province practically everything that has happened to the human race. Man is a microcosm and to ask the historian to deal with the whole of his thoughts, acts, passions, aspirations, environment, is much like asking the physical scientist of an older day to deal with the whole cosmos at once. In another respect, however, the historian's field is sharply limited. In spite of the various mathematical systems possible, any one of them may be considered valid *semper et ubique*. A chemical atom also acts in the same way for the chemist in Sirius or in his laboratory, and acted the same way a million years ago as today. A biologist may study the growth and construction of living cells by the million. The historian is limited to a certain number of documents, using the word in a broad sense, prepared in the first place, and saved to us in the second, by all sorts of fortuitous chances, present at all for only a few thousand years past and in any considerable quantity for not more than one or two. This is indeed scanty material on which to base broad generalizations or to erect laws. But even this material is characterized by a great and almost insuperable difficulty, the individualization of every item in the historian's data. I have treated of this elsewhere and need not dwell on the point here, but merely note that for the chemist every atom of oxygen is like every other atom of oxygen, that the biologist can study an infinite number of cells all alike, and so on. The atoms or cells of the historian are individual men and women, and their action and interaction, either as individuals or in large masses as "periods" and "nations" are vastly complicated for him by that fact. Given the enormous complexity of the historian's material, the insufficiency of his documentary evidence for it, and the briefness of the period during which his phenomena have occurred, it is evident that it will be only with the greatest difficulty that the material can be reduced to genuine scientific order, if at all.

Whether that may prove feasible or not, it is impossible to say at the present stage of our investigations, and I think it far wiser to admit that fact, and its implications, than to claim that we already have a science and that therefore we are on the right track. It is far better to ponder the problem and to consider possible methods of solution. The problem certainly needs a solution, whether we can attain to one or not. The kindred one of sociology depends largely upon it and is one of the most pressing in

the immediate future. It is becoming a commonplace, but a no less dangerous situation for that reason, that our knowledge of the physical world and our control over our environment have advanced so rapidly as contrasted with our ignorance of and control over the social organism that we are in imminent danger of destruction by our own one-sided advance in science. It is as though one of a man's legs were growing rapidly so much longer than the other as to threaten his ability to walk. Old-fashioned statecraft was none too good, but with the slow changes in environment in the old days it was wisdom incarnate as compared with what we are likely to be able to count upon if we cannot make some progress in the sciences of history and society comparable to those in the physical ones. In spite of the scientific spirit and the vast amount of data now accumulated, we cannot say that we have reduced either of these bodies of knowledge to scientific order. It is much too early and far too dangerous, however, to admit total defeat. The nature of the material with which the historian has to deal is given and cannot be altered. Stores of manuscripts may yet come to light but not in sufficient quantities compared with what we possess to change greatly the character of our task, however welcome may be the additional details.

What, then, is the situation? Let us grant that we are working in the scientific spirit. As to whether or not the field in which we are working is capable of a scientific ordering we cannot say, but we must perform an act of faith and continue as though it were. To deny it is to deny man's ability to improve his condition by science. To pledge ourselves to follow what may be a forlorn hope in the possibly vain one of saving mankind is nobler than to claim we have already attained where we have not, and to consider our method no further. The problem that must be attacked in the future if there is to be any hope of success is the problem of method. We have attained the scientific spirit. We cannot alter, though we might variously delimit, our field. The only remaining factor is method, and it is to that that I would ask historians to devote their deepest thought, for it *will* take thought, thought far deeper than is involved in writing standard narrative history or monographs on some special incident or institution.

Perhaps it is not right to ask the historians to do this. We must always have histories of the sort we have had and there is no chance of making science out of narrative history, however much of the scientific spirit may go into their writing. The more we consider the problem, the more complete the change in method required appears to me to be. In fact it is so complete that I question whether the new science, if one is to arise at all, would bear enough resemblance to what we have always considered history as to warrant our using the same name for it, it being always better to get (*Continued on page 380*)

FROM A WOOD BLOCK ENGRAVING BY HOWARD McCORMICK OF A MURAL, "MAKING OF GRINDING WHEELS," IN NORTON HALL, WORCESTER, BY ARTHUR COVEY

Ewing Galloway

TROLLHÄTTAN RAPIDS

THE NEW SWEDEN*

The Vikings Have Become Able Scientists and Engineers

By Waldemar Lindgren

FOR the last 50 years I have followed with interest the transformation of the land of my youth — a land of primitive industries — into an industrial and manufacturing country. During a recent visit I was particularly impressed with the far-reaching and deeply interesting nature of these changes.

These old-time industries were agriculture, lumbering and export of rough lumber, fishing, mining, and smelting of iron ores to pig iron and steel. Of course, there were always manufactures, but these interests never dominated. About 1880 there were only 60,000 persons employed in manufactures with products totaling only $40,000,000. At the present time there are about 12,000 factories with a personnel of about 350,000 and a total value of products of well over $1,000,000,000. This tells the story. Of course, the industries are still largely based on the primitive resources, timber and iron, to which must be added the utilization of electric power. But instead of steel, machines are exported; instead of raw lumber, wood pulp.

It may be said without exaggeration that Swedish engineers and financiers have planted their flag in the four corners of the earth. A wise and cautious policy — the only one that could be pursued without courting destruction — has enabled an originally poor and sparsely populated country to expand and grow wealthy, and all this has been accomplished without political pressure or "mailed fist" methods. To a considerable extent this prosperity is shared by Norway and by Denmark but different factors enter and conditions are not exactly comparable. Sweden is a rather large country — nearly 1,000 miles long from north to south and about 250 miles wide. It

Ewing Galloway

STOCKHOLM FROM THE CITY HALL TOWER LOOKING DOWN ON THE PUBLIC BATH HOUSES

*I have purposely avoided stressing statistics. Many of the data as to production, and so on, are taken from the useful handbook entitled "The Sweden Year Book," published yearly in English.

has a population of 6,000,000, about the same as Illinois or Ohio. It has a climate ranging from temperate to cold. Not long ago it emerged from under the Quaternary ice sheet; except for some areas in the south the soil is rocky and poor. Even now it does not grow enough grain to feed its inhabitants; practically no wheat is raised.

At least 3,000 years ago the country was settled by Aryan Germanic people, known as the Svea tribe and the tribe of the Goths, the former leading politically. Hence the name of *Svearike*, contracted to *Sverige* and corrupted in foreign languages to Sweden or *Schweden* or *Suède*.

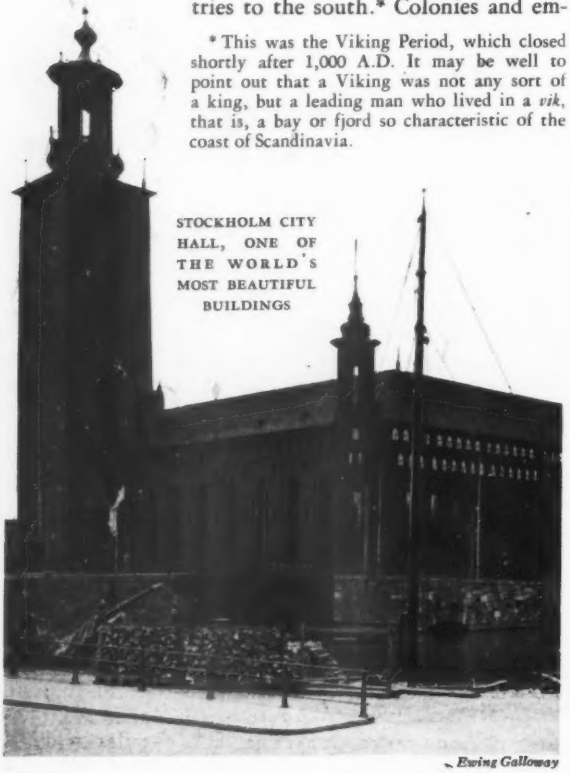
Ewing Galloway

GREAT OPEN PIT IRON MINES AT FAHLUN

Since earliest times Sweden has been a self-governing democracy under kings whose power was limited by assemblies. Every man owned the soil he cultivated. The serfdom of peasantry has never existed. This class of land owners, though diminishing, still makes the mainstay of the State. There are proud generations of this *bonde* class who have tilled the same farms for hundreds of years though still preserving their simple life. Gradually other classes developed: aristocracy, clergy, merchants. At the present time the elected Congress is divided in two chambers, in which all elements of the population are represented.

Through centuries, before the introduction of Christianity, about 1,000 A.D., the tribes made their living from the scant natural resources, but ever there was a tendency among the Scandinavians to push outward in wild and not always praiseworthy enterprises. They harried and plundered the richer countries to the south.* Colonies and empires were founded in Finland and in Russia as well as in England, Scotland, Normandy, and even Sicily. After a turbulent mediaeval history, Sweden broke into European politics and from 1630 to 1720 was one of the greatest powers of that continent, a glory dearly bought by exhaustion and impoverishment.

* This was the Viking Period, which closed shortly after 1,000 A.D. It may be well to point out that a Viking was not any sort of a king, but a leading man who lived in a *vik*, that is, a bay or fjord so characteristic of the coast of Scandinavia.



Ewing Galloway

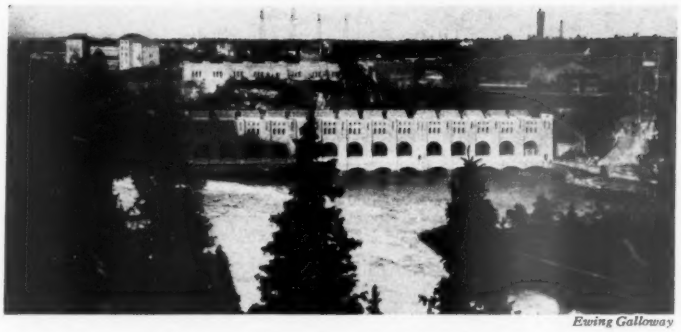
STOCKHOLM CITY HALL, ONE OF THE WORLD'S MOST BEAUTIFUL BUILDINGS

Perhaps the first and strongest impression which a casual visitor receives upon entering Sweden is the homogeneity of the people. There is little admixture. Probably it is the purest Nordic race known. The Swedes are conservative: even with the present adverse factors, such as crowding to the cities, multiplying of the manufacturing population, and ensuing reduction of the birth rate, there is extremely little communism. The Socialists are strong, however, and getting stronger. Twice Sweden has had a socialistic or part-socialistic government, but it is a mild and sensible socialism with no threats of revolution and execution. It is easy to imagine the volumes of propaganda from the East, but so far it has had little effect. There is much freedom in Sweden — I should say considerably more than in our own country. Any Swede can get upon the soap box and propound his ideas short of murder and inciting to open rebellion. But if a foreigner should attempt to do this he would probably be deported very promptly.

For a long time Sweden has been a protectionist country. Manufactured articles have ever been expensive. The result is shown by the development, so that now more than half of the population is engaged in industries, transportation and trade.

Sweden is prosperous and the year just closed has been one of the best in its recent history. There has been some labor trouble, but there was little unemployment and the wages are high — higher than in most European countries. The wages of the building trades were abnormally high in 1929. The state finances are in an excellent condition and the banking system extremely sound. Perhaps it is not realized that the Government derives a splendid income from its railroads, its telegraph and telephones, and even (strange reading in the United States) from its postal department. Naturally there are some drawbacks in part already referred to. In close parallelism to our own conditions, the principal worry seems to be in relation to agriculture. The tillers of the soil claim that they can make no profit.

In proportion to the population the accomplishments of the Swedish scientists and engineers are second to none in the world. It is their victories I shall try to relate.



Ewing Galloway

DAM NUMBER 2 AT TROLLHÄTTAN, ONE OF SWEDEN'S INDUSTRIAL CENTERS

Basic Industries

IRON ORE, forests, and waterfalls, these are three foundations upon which much of the industrial development is based. Of fuels, coal and oil are present in negligible quantities; peat is abundant but seems difficult to utilize.

Iron Ore. Since mediaeval days the iron ores of Sweden have been famous for their high quality. Most of them occur in a belt in the central part of the country. They are smelted with charcoal to pig iron, the annual production, which is not increasing, amounting to about 500,000 tons. There are also other deposits of export ore; the largest is located at Kiruna, north of the Arctic circle, and contains an enormous quantity of high grade magnetite ore, at least 1,000,000,000 tons, carrying more or less phosphorus. These ores cannot be smelted with profit in Sweden, hence are exported to Germany, England, and to the United States. The ore is extraordinarily rich, carrying from 60 to 64% of iron, and about 9,000,000 tons are exported annually. In the Kiruna deposits the Swedish Government is part owner, and it controls the export. This mass of iron ore projects as a hill above the general level of the country and is mined in large part by open cut method. Electrified railroads carry the ore to the Swedish and the Norwegian coasts, the latter being ice free. The power needed is produced at the great falls of Porjus yielding 150,000 h.p.

The export is carried on by the *Aktiebolaget* Grängesberg-Oxelösund*, which also controls the southern export fields.

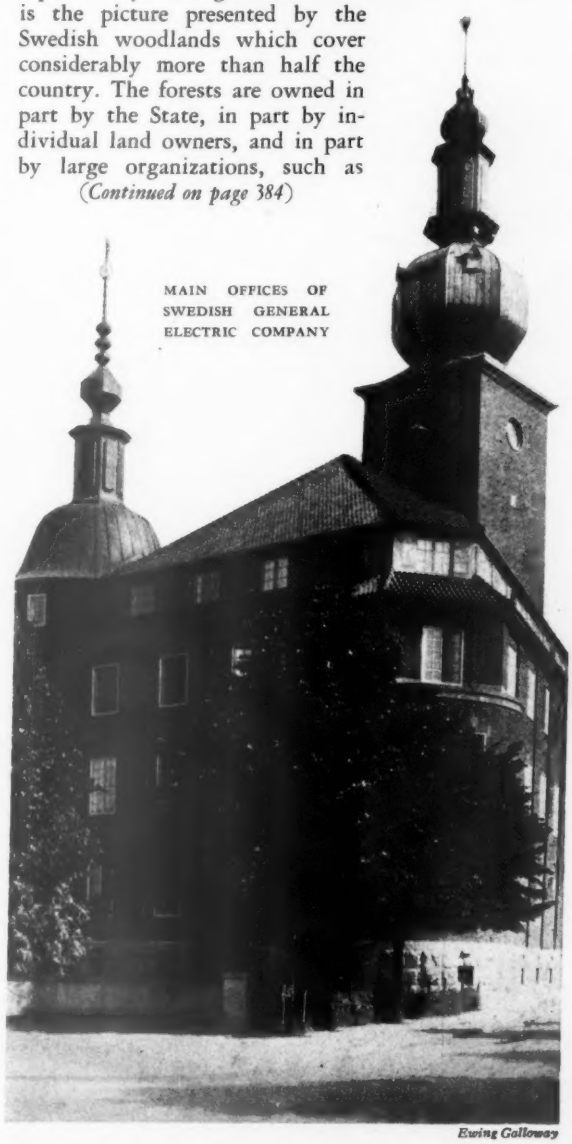
The mining of other metals is negligible; there is a well-known large zinc deposit at Åmmeberg, which is owned by a Belgian company, and extensive ore deposits rich in copper, gold, and arsenic have lately been found in northern Sweden. For centuries Fahlun was one of the most famous copper deposits in the world, the charter of its company dating back to about 1234 A.D.

Water Power. From the height of land and from the Norwegian frontier hundreds of swift rivers, with rapids and waterfalls find their way to the coast. They contain potentially, it is estimated, 4,000,000 to 6,000,000 horse power of which about 1,300,000 are utilized. One of the largest plants is that of Trollhättan with 150,000 h.p., and this like the Porjus is owned by the State. Dozens of smaller plants supply the electricity needed for industrial and home purposes. It is said that over 50% of the Swedish farms are electrified. The railroad line, Stockholm–Gothenburg, is already under electric power, the line Stockholm–Malmö will soon be. Just now the most pressing problem is to utilize the water power of Norrland for the wood pulp factories.

According to the plans of Kreuger and Toll the ten power plants at Hammarfors with 60,000 h.p. will be linked to the mills of the recently organized Swedish Cellulose Company by a line 186 miles long and carrying 70,000 volts. This will control 30% of Sweden's pulp mills and the concern is expected to control 250,000 h.p. In 1913 there were 1,449,000,000 kilowatt hours produced in Sweden. In 1928 it had risen to 4,410,000,000.

Forestry. Dark green forests of pine and fir mirrored in innumerable lakes; hills rising to ridges and mountains separated by rushing streams. This is the picture presented by the Swedish woodlands which cover considerably more than half the country. The forests are owned in part by the State, in part by individual land owners, and in part by large organizations, such as

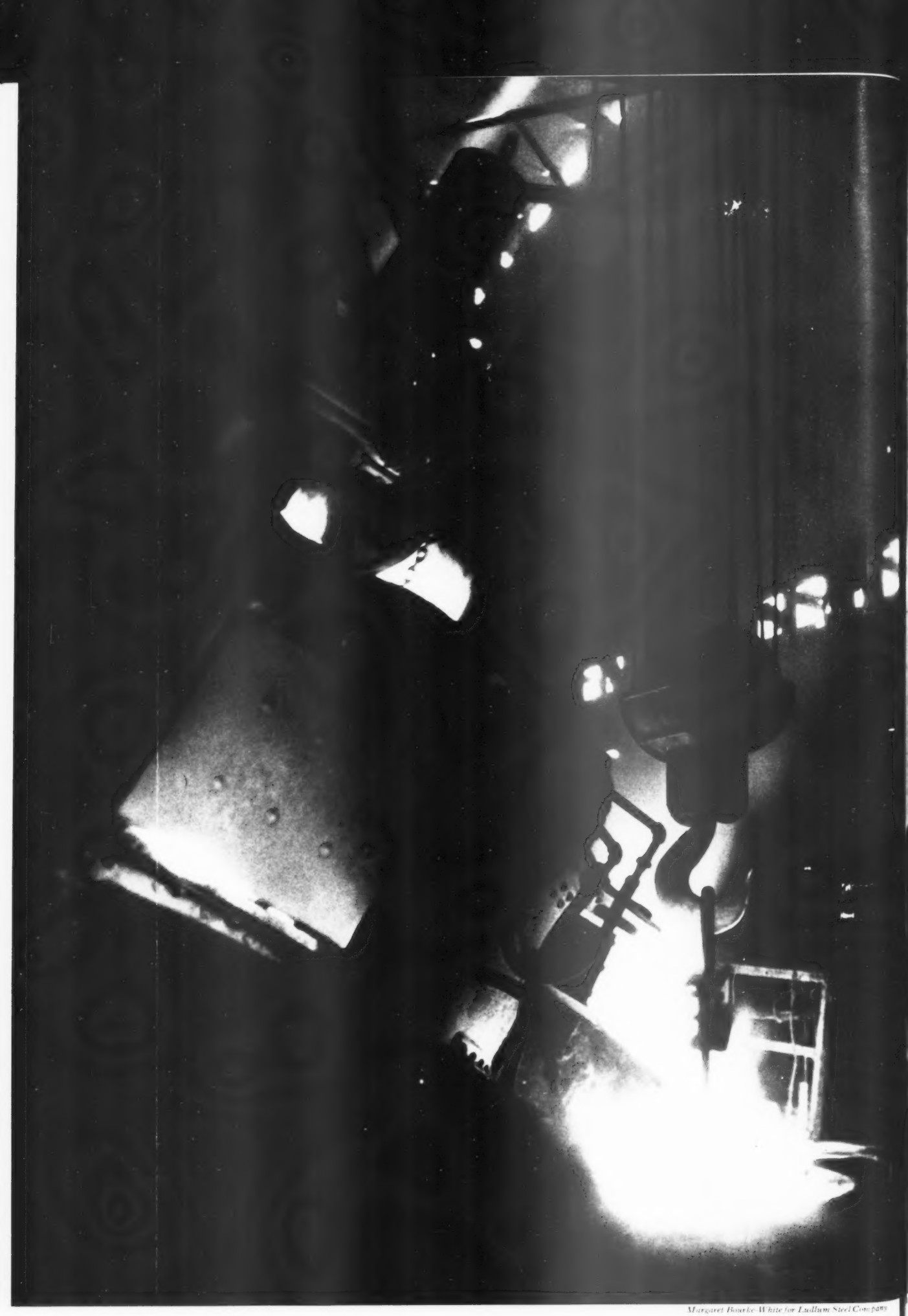
(*Continued on page 384*)



MAIN OFFICES OF SWEDISH GENERAL ELECTRIC COMPANY

Ewing Galloway

* *Bolag* means company; literally household.

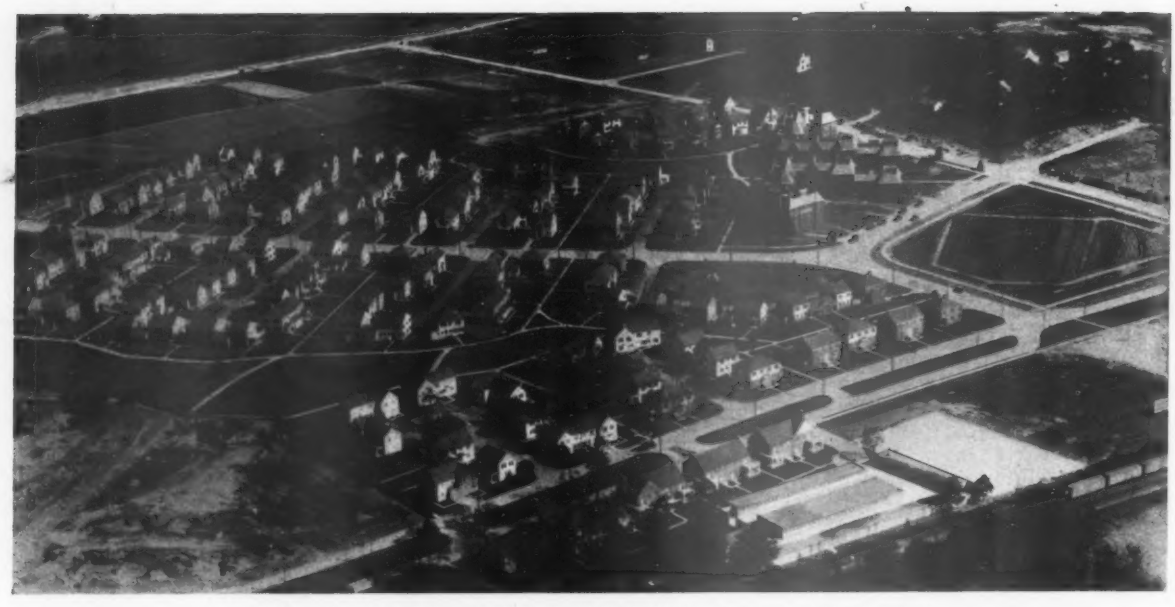


Margaret Bourke-White for Eudlum Steel Company

DURING A HEAT

Margaret Bourke-White for Niagara Falls Power Company

MARCH OF THE DYNAMOS



FIRST RESIDENTIAL SECTION OF RADBURN, ILLUSTRATING THE SUPER-BLOCK SYSTEM

A TOWN FOR THE MOTOR AGE

Radburn, N. J.—A Notable Experiment in City Planning

By Henry M. Propper and Thomas C. Desmond

IS IT *lese-majesté* to challenge the perfection of our big cities and the life pattern which they impose? Certainly some of their attributes are open to serious question. Their common denominator is a chronic traffic problem grossly wasteful for business, hazardous for men and women, and fatal for children's play. Equally characteristic is the lack of decent housing for the bulk of the inhabitants, the sort of housing which permits or encourages a rounded, healthy home life for the family. In most cities outdoor recreation must be worked for as earnestly as the daily bread and butter.

Easy, convenient, unrestricted flow of traffic is almost impossible in urban communities built upon the present plan. In attempting to achieve it cities are spending enormous sums in making over horse- and buggy-sized streets into automobile streets and by installing increasingly elaborate schemes for regulation and control of traffic movement. The relief obtained is often inadequate and usually only temporary, since two basic factors operate to check the extent to which such changes can be made, namely, the street pattern to which cities are irrevocably committed by existing buildings and the huge cost of cutting through new streets or widening old ones on land already built upon and loaded with city values.

AN APARTMENT COURT AT RADBURN

Some reason probably existed for planning cities on the checkerboard or gridiron street system. It may have been the convenience of 25 x 100 foot lots for real estate operators or it may have been the horse and wagon; be that as it may, it is the traditional, orthodox scheme and has been almost universally followed. Under the strain of modern motor traffic the checkerboard street system appears to have broken down completely. There are too many intersections, and therefore too many interruptions to movement in either direction. The joint use of streets by vehicular and pedestrian traffic has resulted in a major hazard to life for city dwellers and has restricted the free use of automobiles. This result is apparent in every large American city.

TO find means of eradicating these impediments from our urban communities and of solving these acute problems of city life, a full size laboratory experiment in town planning is now being undertaken by the construction of Radburn, a "Town for the Motor Age" between Hackensack, Ridgewood, and Paterson, New Jersey, about fourteen miles in an airline from New York City. The scale of Radburn, however, is greater than usual for experimental developments, for it includes a town site of 1250 acres, a plan for an ultimate population of between 25,000 to 40,000, with the necessary relations of dwelling houses or business buildings, and manufacturing establishments and an ultimate expenditure of over $60,000,000.

PEDESTRIAN UNDERPASS CONNECTING PARK SYSTEMS OF TWO SUPER-BLOCKS. CHILDREN CAN GO FROM ONE BLOCK TO ANOTHER WITHOUT CROSSING A TRAFFIC STREET

In spite of its proximity to New York City, the Radburn site had continued in agricultural use down to a little more than a year ago when the new project was begun. Only two or three roads traversed the tract and therefore the town planners had a free hand in applying a street pattern. They considered first the question of function or use, recognized the conflict inherent in the gridiron scheme, and as a first step determined on a redistribution of these functions in the residential districts of the town. For vehicular traffic they provided a system of broad avenues, having about four street intersections to the mile in place of the 16 or 18 common to the gridiron plan. For pedestrians they provided a separate system of walks entirely removed from the traffic ways and so linked by underpasses that the two did not come into opposition at any point.

The Radburn town planning scheme is based on the use of a unit, several times the size of the average city block, which for want of a better name we will call a super-block. Highways for vehicular traffic constitute the boundaries of the super-block and send in fingers or lanes toward, but not to, the center. These lanes are closed-end streets or *cul-de-sacs*, and most Radburn homes are grouped around them rather than on the traffic avenues. The center of the super-block, for approximately its entire length, is given over to a stretch of park ranging from five to seven acres in area. Fringing this park are sidewalks exclusively for pedestrian use from which fingers of concrete, also reserved for people afoot, extend out to the motor roads. The pedestrian walks are spaced so that they alternate with the closed-end streets. In driving along a main motor road one passes alternately, at intervals of about 100 feet, closed-end streets open to vehicular traffic and walks exclusively for pedestrians.

Radburn homes occupy these intervening spaces and face in one direction on a street devoted to wheel traffic and in the other on a narrower street designed for foot traffic only. The practice has grown of referring to Radburn houses as having two fronts and no backs, a motor front and a garden front. They have two front yards, two main entrances and face on two public thoroughfares, one for vehicles and the other for pedestrians.

At one point in the super-block, the central core of park land reaches out to the motor road, dives under it and connects with the park in one or more adjoining blocks by means of a pedestrian underpass. Since all of the parks and their contiguous walks are devoted entirely to pedestrians there is provided by this method a complete and practical circulatory system which makes it unnecessary to once cross a motor road in going from one point in the residential section to another. Pedestrian traffic encounters no hazards in Radburn.

SHOPPING CENTER AT RADBURN

THE full import of these changes can be judged best from their effect on the individual householder and his family. In the great majority of cases his house is on a *cul-de-sac* about 400 feet long or is one of the group closing off the lane at the park end. His home is quiet and peaceful, for the only traffic that passes his door is the traffic headed toward one of the not more than 20 houses in the lane. In no case is he more than 400 feet from the park or a like distance from a main motor road. The closer he is to one the further he is from the other but in no event is the distance more than 400 feet. His children can leave the house by the garden door, go along the walk to the park and thence to school, crossing the motor road by means of the underpass. With (*Continued on page 396*)

Fairchild Aerial Surveys, Inc.

LAKE CHAMPLAIN BRIDGE NEAR PORT HENRY, N. Y. FAY ['93], SPOFFORD ['93], AND THORNDIKE ['94], ENGINEERS

THE BRIDGE-BUILDERS

AMERICANS may well call themselves bridge builders. Monumental enduring structures daily grow more numerous: Lake Champlain has been crossed; the Hudson River and Poughkeepsie Bridges raise their towers aloft; the Detroit River has been spanned by the great Ambassador Bridge; the International Peace Bridge joins Buffalo with Canada; Arlington has its Memorial Bridge; Rhode Island its Mount Hope Bridge; Norfolk its James River Bridge. At least nine suspension bridges with channel spans greater than 1,000 feet, and one cantilever of 1,182 feet, already span American rivers, not to mention the many steel arch and simple truss structures with spans of 500 feet or more.

The American engineers working in steel are bold and skillful descendants of the great Roman and English pioneer bridge builders, who left so many audaciously permanent and beautiful masonry structures. It was not until 1777 that iron came to be used; in that year the British swung a span across the Severn with a cord of 100 feet, and an iron, semi-circular arch. Thirty-six years earlier Brooklyn Bridge was foreshadowed when a chain bridge was thrown across the Tees.

Historians have often pointed out the influence of bridges on the life of peoples, and in the Middle Ages their construction and care was considered a pious, holy work. In his admirable lecture, "The Commerce of Thought," Sir Arthur Quiller-Couch notes that: "A religious order of *Pontiffs* (Pontifices, bridge-makers) built bridges in many countries of Europe. The famous Pont d'Avignon was one;

H. Armstrong Roberts

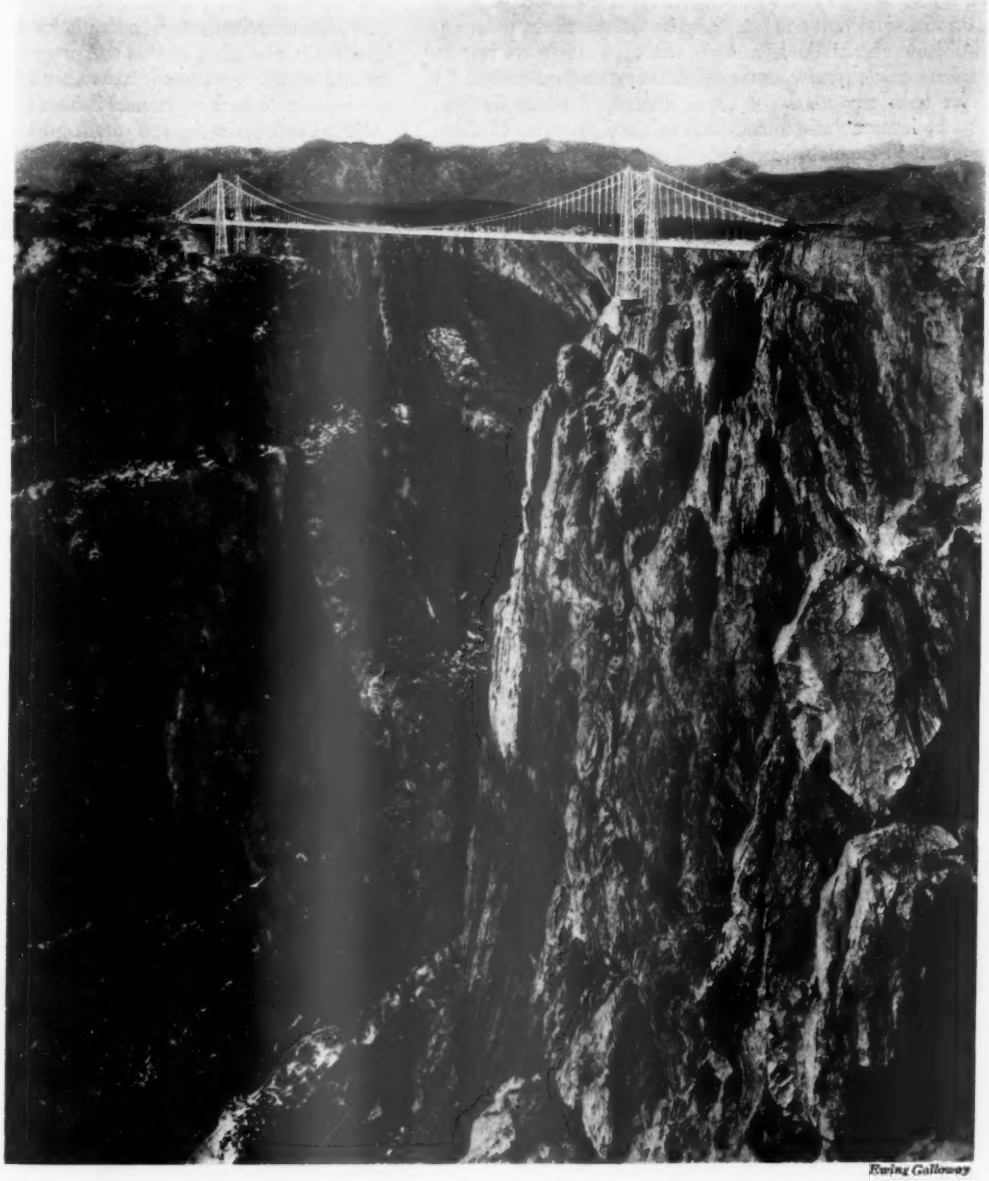
PONT DU GARD NEAR NIMES, FRANCE. AN AQUEDUCT BUILT BY THE ROMANS

Pont St. Esprit (still in use) was another. A bridge with a chapel on it was one of the most familiar features of medieval England — a chapel and a toll-gate — the church being no more averse then than now to 'take up a collection.' Old London Bridge, with a chapel on it — Old London Bridge which for centuries was the marvel of England — Old London Bridge which (mind you) remained until the middle of the Eighteenth Century, until Dr. Johnson's day, the *only* bridge spanning the Thames — was begun in 1176, finished in 1209, with its twenty arches, by subscription of the charitable."

Edwin Levick

BEAR MOUNTAIN BRIDGE ACROSS THE HUDSON

Cristian Barmam, in his charming essay on bridges in the new "Encyclopaedia Britannica" points out several times when bridges, had they been built, would have changed the course of history. The great River Severn, hemming in Margaret of Anjou, made it possible for Edward to capture her. Here in the United States the unbridged Chickahominy proved itself a mighty ally of Lee and foiled McClellan in his advance on Richmond early in the Civil War.



Ewing Galloway

NEW SUSPENSION BRIDGE ACROSS THE ROYAL GORGE OF THE ARKANSAS RIVER. IT IS 1,260 FEET LONG WITH A MAIN SPAN OF 880 FEET, AND IS 1,053 FEET ABOVE THE RIVER

PRESIDENT-ELECT

A Vignette of Karl T. Compton, Physicist and Educator

By J. Rhyne Killian, Jr.

ALREADY so much has been written about Dr. Compton — Karl Taylor Compton, Ph.B., Sc.M., Ph.D., Sc.D., as it will be indited in the Institute's Directory of Officers — that this new effort may be carrying coals to Newcastle. Any additional biographical material about him runs the risk, not only of repetition, but of flying into the face of the demonstrated fact that Dr. Compton eschews personal publicity. Last month while having a brief interview with him, I produced a number of newspaper articles about his coming to Technology, venturing to inquire about their accuracy in biographical details. One would have been impercipient not to have detected his aversion to them. "I have seen too many of those already," he countered, but he immediately added that he thought most of them were in the main correct. "I am afraid, however," said he, "that some one in my home town became too garrulous."

He was referring to the many stories about him which old residents of Wooster, Ohio, immediately remembered upon the announcement of his election to the Presidency of the Institute. His propensity for date pie; for Homer's "Iliad," and Scott's novels; the Homeric story of how he broke a tie in a football game in 1907 by the longest drop kick any Wooster football player has ever made; the yarn about his placing a class banner at the top of a new 140-foot smokestack; accounts of his skill as a baseball pitcher, mainly the result of his use of the almost-forgotten spitball — all of these anecdotes and many more were immediately salvaged from local folklore when the story "broke" of Dr. Compton's election. It is understandable that, to one of America's most accomplished physicists, these tales might seem irrelevant, but to those of us — which means the most of us — who are interested in knowing something of the non-professional side of the Institute's new President, they are valuable and illuminating facts. They satisfy our desire that a man who holds this high place should have that quality which Emerson once prescribed in his Journal — the ability to judge and admire a good barn as well as to master more abstruse subjects. Certainly Dr. Compton has always been fond of good barns. Since he has grown to maturity the concentration which he has applied to widening the boundaries of our physical knowledge has not served to exclude from his life those touches of nature that make the whole world kin.

A valuable benchmark in surveying Dr. Compton's career is the award in 1923 by Wooster College of its doctorate of science to him. In presenting the degree, the first honorary one given to its recipient, W. R. Westhafer, Professor of Physics, said:

"Karl Taylor Compton, teacher, scholar, scientist. Graduate of the College of Wooster in the class of 1908 and granted the Master's degree in 1909. Fellow in Physics at Princeton for two years; Doctor of Philosophy, Princeton, 1911, with *summa cum laude*, a rare distinction; Professor of Physics in Reed College for two years; Professor of Physics and Director of Research, Princeton, since 1917.

"During the war, Aeronautical Engineer for the Signal Corps of the United States Army, later Associate Scientific Attaché of the American Embassy in Paris. . . .

"Author of thirty-five papers published in this country and England covering a wide field of research in pure physics including Photoelectric Effects, Ionization, nature of Magnetism, Motion and Behavior of Electrons, all important contributions to the progress of modern physics and marking the author, still in his youth, as one of the most able men of science in this country.

"Eminent investigator, distinguished university lecturer, faithful teacher. Mr. President, Professor Compton has a special claim on our gratitude. Trained in this classical Christian college, he has studied science, and, guided by her spirit has searched to find the facts. He has honored his Alma Mater and today for him she speaks her highest word. In a very special sense he is one of us. Born on this hill, reared in the very shadow of these college walls, son of a father whose debt this college can never repay, true child of Wooster. I present him to you, sir, for the honorary degree of Doctor of Science."

At the time of receiving this degree, Dr. Compton was 35. Obviously the years from 1908, when he graduated from Wooster, until 1923 had been filled with industry and rich achievements. The drop-kicker and baseball player had become one of America's leading physicists, an important investigator in the fields of photoelectricity, ionization of gases, soft x-rays, spectroscopy in extreme ultraviolet, fluorescence and dissociation of gases, electric arcs, and types of gas discharge.

His work during the World War mentioned by Professor Westhafer, and glossed over by most of the newspaper reporters, was of great aid to the United States, and Dr. Compton speaks of it with obvious relish. For a period he worked in the Edison laboratories studying the propulsion of torpedoes. Later he turned to sound ranging and subsequently he personally designed one of the most important sound detectors used during the War. This work, which took him to Europe as an aeronautical engineer in the Signal Corps, threw him in association with the great English scientist, W. L. Bragg, whose father will probably be present at Dr. Compton's inauguration. During these years he gave much to the American cause, but no doubt the experience also had its rewards for him in the contacts he made. During the last ten months of the War he was in Europe as associate scientific attaché at the United States Embassy in Paris, as representative of the Departments of Military Intelligence, Naval Intelligence, and the Council of National Defense in matters pertaining to war inventions.

Since Professor Westhafer's remarks were made, Dr.

Compton has become Chairman of the Department of Physics at Princeton, and the increase in his research activities is indicated by the fact that the 35 papers mentioned by Professor Westhafer now total approximately 100, not to mention more than 100 more prepared by other men under his supervision.

His associations with the organized bodies of American science have likewise broadened. He was Vice-President of the American Physical Society from 1925 to 1927 and President from 1927 to 1929. Since 1927 he has been chairman of the division of physics of the National Academy of Science. He is a member of the executive committee of the National Research Council and of the American Association for the Advancement of Science. He is Research Associate of the Carnegie Institute of Washington and member of boards of advisors of several research organizations. He is chairman of the physics sub-committee of the National Research Council on the Chicago 1933 Exposition. Last month when he addressed the Faculty Club at the Institute he chose this latter work as the subject of his talk, a fact demonstrating his great interest in the humanization of science. Matthew Arnold has said, "The correct record for the outward life of a man is the clear consenting voice of all his contemporaries. . . ." These many recognitions that have come to Dr. Compton represent this clear consenting voice and attest to his great abilities as a scientist and his admirable qualities as a man. And he still is a young man, 42 years of age!

The election of Dr. Compton has called attention to the uniqueness of the family from which he came. All members of it have achieved distinction; it is a family of educators and research workers hardly equaled in American academic history. In an editorial, "Those Comptons," F. Lauriston Bullard of the Boston *Herald* recently apotheosized the father: "Almost a half century ago on College Hill at Wooster in Wayne County, Ohio — both county and city named for historic American patriots — a Presbyterian clergyman named Elias Compton built a home of the type traditionally held to be representative of much that is finest in America. . . . The father, by native bent a student, a specialist in philosophy, spent but little time in the pulpit, coming almost directly to the College of Wooster from the Theological Seminary. As 'Compy' he was known and liked by thousands of students in their college days. . . ."

Arthur Compton, youngest of the three sons, is a professor at the University of Chicago, and in 1927 won the Nobel prize in physics. The second son, Wilson M. Compton, spent several years in the public service, much of the time as an investigator for the Federal Trade Commission, and performed many missions for Mr. Hoover, then the Secretary of Commerce. Today Wilson Compton is Secretary and General Manager for the Lumber Manufacturers' Association.

The sister in India is the wife of Charles Herbert Rice, President of Ewing College in Allahabad. Such are the other three distinguished children of Elias and Otelia Augspurger Compton of College Hill, Wooster.

It is interesting to observe that both Drs. Karl and Arthur Compton were taught by Professor Owen W. Richardson, at Princeton, himself a winner of the Nobel prize. It is also revealing to note that Karl, like his brother, is one of the many great American physicists who have at one time or another been associated with the Ryerson Laboratory at the University of Chicago — Stratton, Millikan, Michelson, Jewett, '03, to mention a few, have some time during their careers worked there; Karl has lectured at the Ryerson Laboratory during two quarters and is, in fact, engaged to lecture there this summer.

The house built for Institute presidents, not only admirably befits that position and serves as a dignified center for academic social life, but in addition it is an admirable place for the training of children. It is well that this is true for Dr. and Mrs. Compton have three, ranging in age from three to fifteen (the oldest is by Dr. Compton's first wife who died not long after their marriage). Mrs. Compton is the former Margaret Hutchinson, daughter of Professor J. Corrin Hutchinson, Emeritus Professor of Greek in the University of Minnesota. Her academic background, of course, fits in beautifully with the academic occupation of her husband. When not occupied with the children, she has been active in social service work.

"Approachable" is an adjective invariably applied to Dr. Compton. The manner of his greeting is so unaffectedly cordial, his smile so disarming, his speech so decisive and unequivocal, that an interviewer is impressed by the exceptional hospitality with which he is received, and more, by the dispatch with which Dr. Compton disposes of his questions.

Before becoming President he is naturally disinclined to advance any ideas which he has about administrative policies. That he has, however, a clear and comprehensive conception of the Institute's work is shown in his happily composed letter on page 365, which he readily agreed to write when I suggested that the Alumni of the Institute would appreciate some expression from him. Note in that letter how well he voices the educational philosophy of the Institute's work. It becomes evident that Dr. Compton will be a President who can give voice to the Institute's ideals, who can carry its philosophy to the outside world, who can himself be a symbol of those things for which the Institute stands.

If he is not yet in a position to discuss policies and plans, he can talk about science, particularly physics. After giving me details for preparing the material presented above, he talked for a few minutes on the present state of physics and its possible future trend. The latest Einstein paper, he feels, is of no immediate or directly applicable importance but it is of great philosophic interest. The most important aspect of modern physics is the development of the quantum theory, a field which influences his own work in ionization and in the spectroscopy of the extreme ultraviolet. He commented on Dr. Mayer's article in the March Review, "Can Americans Be Scientists?" expressing agreement with Mayer's contention that America's scientific accomplishments equal those of any other country. It was unfortunate, for me at least, that when he was describing the nature of the work being done by Dempster, Davisson, and others that a caller interrupted.

On June 6 and thereafter, however, he will be able to speak for himself and the Institute will have one of the youngest American college presidents.

THE TREND OF AFFAIRS

New Musical Instrument

THE REVIEW is privileged to announce the development, in the laboratories of the Institute, of a new, manually-played musical instrument which produces its sound by electrical vibrations controlled by a pianoforte keyboard. This significant instrument, entirely unique in its musical capacities, can produce, not only the sound of existing instruments, but, of more importance to the musical world, can create sounds and effects beyond their range.

The new medium, to which no name has yet been given, has been evolved by Arthur C. Hardy, '18, Associate Professor of Optics and Photography, with the assistance of Sherwood F. Brown, '23, Instructor in the Department of Physics. The work was made possible by du Val R. Goldthwaite, of New York City, who conceived the broad invention and supplied the funds for its development.

Davis

SHERWOOD F. BROWN, '23, AT THE KEYBOARD OF THE NEW MUSICAL INSTRUMENT ANNOUNCED ADJACENTLY

The first model, which was initially played several months ago, has a three-octave piano keyboard and the sound it produces is made to simulate the sound of an organ. By changing the wave form on the disk described below, the sound of a clarinet, oboe, violin, or any wind or string instrument may be produced by playing the keys, piano fashion.

To the reproduction of the sound of all these instruments, the device contributes in every instance some additional effect of great value to the musician. In an organ, it is impossible to accent important notes in a phrase, and, in an effort to minimize this drawback, the organ builders have had greatly to elaborate and complicate the instrument by adding swell organs, together with Great, Choir, Solo, and Echo manuals. In the electrical instrument, however, the amount the key is depressed affects the intensity of the note produced and consequently notes may be accented. This result, only approximately obtainable from an organ's expensive complications, thus may be fully achieved simply and inexpensively.

It is unthinkable that either vibrating strings or air columns as employed in most existing instruments can produce all of the most pleasing musical sounds. A new instrument, such as Mr. Goldthwaite's and Professor Hardy's, utilizing the more versatile light and electrical vibrations, may fill in the gaps and create new musical tones which are, or may become, pleasing to the ear.

Versatility is by no means its only superiority. Apart from the inability of most instruments to play in the natural scale, there is generally a change of pitch when the force is altered with which the instrument is played. This may spoil an harmonious combination of notes desired by the composer. In addition there is always the difficulty of tuning instruments exactly and keeping them in tune. Mr. Goldthwaite and Professor Hardy have avoided all of these limitations.

THE HEART of the instrument is an opaque glass disk on which are recorded photographically a number of concentric sound tracks (circular, wavy, transparent lines) through which light may pass. This disk is rotated rapidly with a photoelectric cell on one side and a small lamp on the other side. Light from the lamp is allowed, by controllable shutters, to pass through the transparent sound tracks on the disk after which it enters the photoelectric cell and there generates corresponding electric current variations. These currents are then amplified and converted into sound through the use of an electrically controlled vibrating diaphragm. The shutters which admit the light of the small lamp to the rotating disk are placed in front of the many sound tracks on the disk, one in front of each track, and they are operated by depressing the proper key on an ordinary piano keyboard.

At a constant speed of revolution of the disk, the pitch of each note is determined by the number of waves on each sound track. This makes it possible to play in the natural or diatonic scale, since the key can be altered by changing the speed of the disk. The quality of timbre of the sound may be varied by changing the form of the wave which constitutes the transparent sound track on the disk. The player of a flute or other wind instrument can sound only one note at a time, but the Goldthwaite-Hardy instrument permits any desired combination of notes within the range of the fingers of both hands.

The instrument now in use employs a disk with a wavy sound track derived from an oscillograph analysis of the tone of a large organ pipe. That wave form, which may be represented by a line with many humps in it, was cut out in the form of a template and inserted in a special machine built for transferring that graphical reproduction of sound to circular sound tracks. Professor Hardy designed his instrument to make it easy to change disks, and the inexpensiveness of the disks makes it feasible to have numbers of them, each representing some instrument or tonal range. These disks, of course, both in construction and fundamental principle, are utterly different from phonograph records and should not be confused with them.

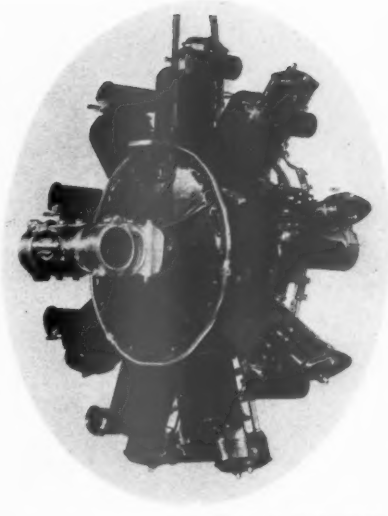
In no way is there a resemblance between this electrical instrument and that popularized by M. Leo Thérémin (See The Review for December, 1928). In the Thérémin-Vox electrical oscillations are controlled both in pitch and loudness by the movement of two hands within the electrical field of two condensers. The Thérémin-Vox is hardly ever exactly in pitch; Professor Hardy's instrument can never be out of pitch.

Those who have heard the instrument, occupying a space no larger than the top of an office desk, have been astonished, not only by its fidelity to the organ and by its own unique individuality as a musical instrument, but by its simplicity. Even with its multiplicity of effects it is hardly more complicated than a radio with a keyboard attachment.

HISTORIANS of music have always pointed out that its development is parallel with the instruments through which it finds utterance. Innovations in music must be accompanied by new instruments or improvements in old ones, as Bach, Beethoven, and Wagner proved in their new musical forms. Since their day, musicians have had almost no new instruments with which to increase their range. Now the application of science to the production of music promises to place at the disposal of the musician resources of which the great masters never dreamed. It is possible that a musician composing for an instrument like that developed here at the Institute might do away entirely with the present system of musical notation with its many limitations and instead write in terms of sound waves.

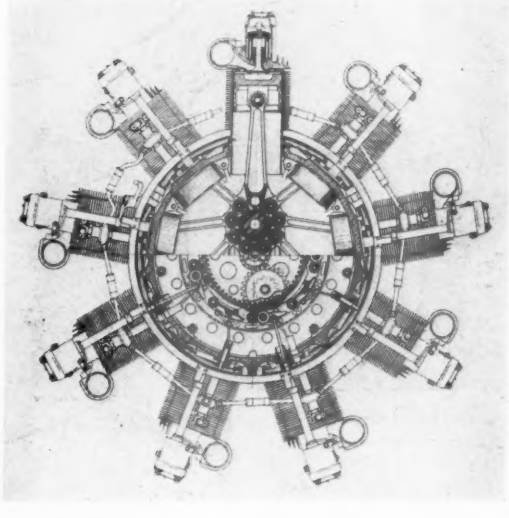
Deems Taylor, composer of the opera, "The King's Henchman," while speculating on the possibility of the phonograph several years ago, envisioned the composer writing directly for that instrument in terms of the wave lines on its records. His prophecy applied to the Goldthwaite-Hardy instrument here at the Institute is equally apt: ". . . The composer, untrammelled by the technique of instruments, will prescribe all producible timbres in whatever pitches and rhythms he pleases, and will have no more direct coöperation with the craftsman who models the phonographic wave lines than the violinist may with Stradivarius. The crude beginnings of this new method of composition will be enormously important."

To produce musical tones electrically, even by utilizing light variations, is not a new ambition. The apparatus developed at the Institute, both for recording and playing, seems simple, effective, and thoroughly operative and the method employed appears to have solved the problems which made previous schemes seem impracticable.



Courtesy Boston Evening Transcript

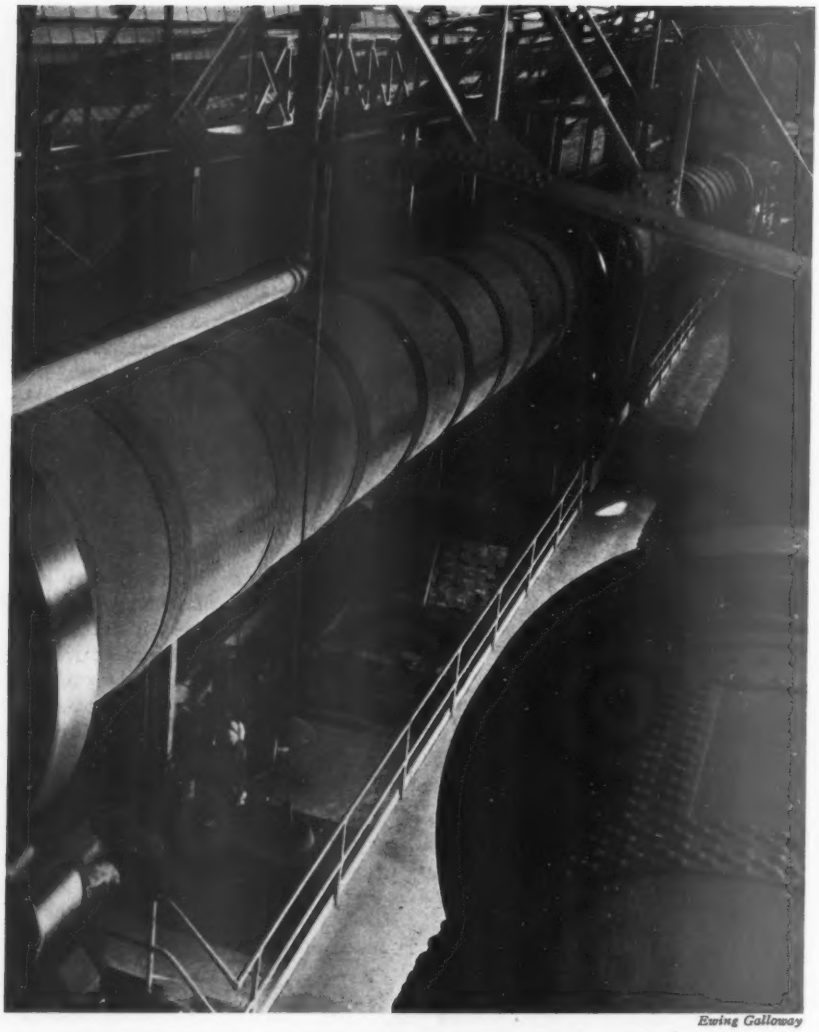
NEW PACKARD 225 H.P. DIESEL ENGINE, THE FIRST SUCCESSFUL AMERICAN ENGINE OF THAT TYPE



Diesels for Airplanes

LAST MONTH brought announcements of two new airplane engine developments and incidentally revealed a competition in engineering design between two great engine manufacturers. The Packard Motor Company with its 225 h.p. radial Diesel in point of time won first honors, but the Pratt and Whitney Aircraft Company with its versatile new fuel system applicable to all internal combustion engines may conceivably have made a greater contribution to aviation, despite the fact that the Packard announcement came first.

The Packard engine is of the radial air-cooled type, having 9 cylinders with a bore of 4 13/16 inches and a stroke of 6 inches. The outside diameter of the engine is slightly over 45 inches, and it is attached to the mounting ring with 8 ⅜-inch bolts arranged on a bolt circle of 22 inches diameter. While not as light per horsepower as gasoline ignition engines, it is far superior to any other Diesel heretofore developed in this country. It runs at 1,900 r.p.m. and is capable of more than 2,000 r.p.m.



Ewing Galloway

GREAT COOKING KILNS IN A STRAIGHT-LINE PORTLAND CEMENT PLANT WHICH USES OYSTER SHELLS AND MUD MIXED WITH GYPSUM

whereas most Diesels are able to turn up only about 300. At 1,900 revolutions it produces 225 h.p. and its weight is but 510 pounds. It is priced at $4,050.

The feature of the new Pratt and Whitney Fuel System is a tiny atomizer which sprays the fuel into the cylinder, where it mixes with the air from the intake valve. In this it is somewhat similar to the Diesel, but here the resemblance stops, save in the fuel range, from which choice can be made.

Fuel is sent to each cylinder through separate lines, driven at high pressure by pumps, and these lines feed the nozzle or atomizer which, in the present engine, is fixed in the head of each cylinder. The throttle controls both the fuel stream and the air to the intake valve. The atomization device is patented by Stephen A. Hasbrouck, one of the Pratt and Whitney engineers, and other patents are pending.

"The application of this device is not limited to aviation," commented George J. Mead, '16, Vice-President of Pratt and Whitney. "It might well be applied to all forms of internal combustion power plants, including farm tractors and heavy trucks."

Tests have been made on automobiles with the new invention and a Model-T Ford equipped with it has been driven 6,000 miles using many types of fuel. It can be attached to the conventional type of air-cooled radial motor and its tests have been made using a 450 h.p. Wasp motor. One feature of great importance, revealed during tests, is that the motor continued its even explosions in an inverted position, an accomplishment of the new fuel system not characteristic of the ordinary carburetor systems.

Science and the Front Page

AN ARTICLE with the above title, published by The Review in December, surveyed science's manifold contributions to news dissemination and prophesied that the telegraph printer and the teletypesetter would not for many years hold their positions as the most advanced transmission devices for the printed word. The truth of that prophecy was indicated last month when a complete page of a California newspaper was read in Schenectady three hours after it came off the press in San Francisco.

This feat was accomplished by a radio facsimile transmitter developed by Dr. E. F. W. Alexanderson of the General Electric Company. The reproduction was made by a new type automatic carbon recorder connected to short wave receiving equipment. The recorder which was developed by Charles J. Young, son of Owen D. Young, Chairman of the Board of General Electric, can be attached to any radio receiver. It prints on a narrow roll of paper which moves through the machine at about one-half inch a minute. The newspaper was reproduced in full size by building it up from narrow strips.

Although this is the first time an actual newspaper page has been broadcasted and reproduced, facsimiles of handwritten messages and other simple forms have been transmitted by radio for some time. In June, 1927, Richard H. Ranger, '11, of the Radio Corporation of America, demonstrated one of the first machines for receiving and reproducing pictures. This was given before the Technology Clubs Associated at the late lamented Waldorf-Astoria. Filching messages from the air from all parts of of the world, Mr. Ranger's machine turned out on rolls the Technology *Radio News*.

Power from the Sea

PERSISTENT, resourceful, wealthy is Georges Claude, French chemist of neon fame. Years passed after he developed his famous neon tubes before he convinced doubting Thomases of their commercial value. Now they are unescapable, their serpentine coils luridly lighting cities all over the world.

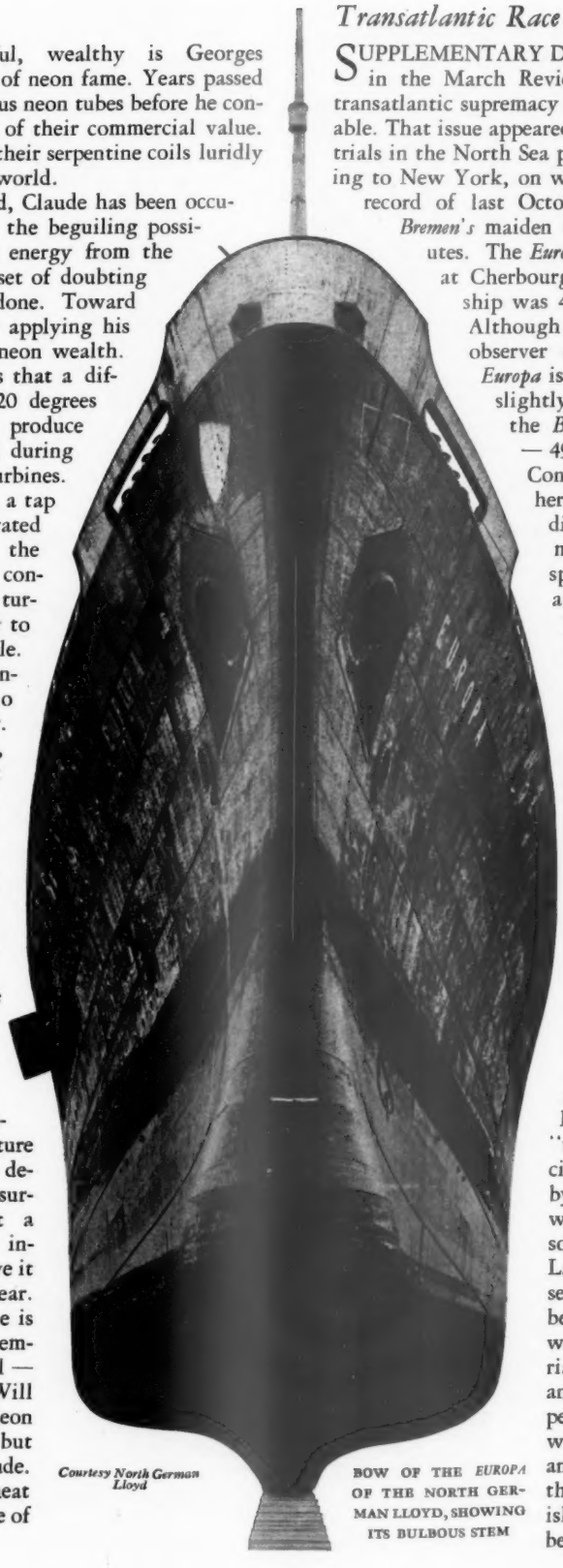
One purpose accomplished, Claude has been occupied for several years with the beguiling possibility of utilizing thermic energy from the sea, of proving to another set of doubting Thomases that it can be done. Toward this end he is aggressively applying his Gallic persistence and his neon wealth.

Briefly stated, his idea is that a difference in temperature of 20 degrees centigrade is sufficient to produce steam, to condense it, and during this process, to propel turbines. Using drinking water from a tap and a little ice, he once operated a turbo-generator before the *Académie des Sciences*. The condensing effect of ice on the turbine exhaust was sufficient to give him a usable heat cycle.

Indifference to this demonstration impelled him to something more spectacular. He went to Ougrée, Belgium, on the Meuse, and built there an experimental turbine of 60-kilowatt capacity. Utilizing an 18 degree difference of temperature between surface water and water deep down, he ran his turbine, according to his report, at 6,000 r.p.m.

That trite but incisive flaunt, "impractical," was still hurled at him. Consequently he boarded his yacht and sailed to Cuba, there to discover near Matanzas a difference in temperature of 20, and sometimes 30, degrees centigrade between surface water and water at a depth of 1,500 feet. He installed his plant only to have it accidentally disabled for a year.

Reports now come that he is persisting in his efforts to employ this temperature fall — "as good as a water fall." Will it prove to be another neon success? Skeptics abound, but they are only bait for Dr. Claude. He calmly insists that solar heat is the only worthwhile source of power.



Courtesy North German Lloyd

BOW OF THE *EUROPA* OF THE NORTH GERMAN LLOYD, SHOWING ITS BULBOUS STEM

Transatlantic Race

SUPPLEMENTARY DATA to the extended comment in the March Review upon the competition for transatlantic supremacy in speed and size is now available. That issue appeared as the *Europa* was undergoing trials in the North Sea preparatory to her initial crossing to New York, on which she bettered the *Bremen's* record of last October by 18 minutes, and the *Bremen's* maiden voyage of last July by 36 minutes. The *Europa's* time from the breakwater at Cherbourg to Ambrose Channel Lightship was 4 days, 17 hours, 6 minutes. Although called sisters (and to the casual observer exact twins externally), the *Europa* is slightly more powerful and of slightly greater draft and beam than the *Bremen*, but her tonnage is less — 49,746 compared with 51,655. Contary to a first report, which her captain denied, the *Europa* did not average 30 knots or more at any period. Yet, despite heavy seas and winds, she averaged 27.91 knots, or about 32 miles per hour, as compared with the 27.86 of the *Bremen*. The *Europa's* best day was her second when she averaged 29.01 knots and logged 703 nautical miles. Officials of the North German Lloyd are confident that within a year both ships will be capable of 30 knots, but no attempt to better 28.5 as a regular scheduled speed seems probable until rivals place newer and faster steamers in service.

Since the March Review, however, further indications of impending competition are apparent although the London *Times* reports that "the White Star Line has decided to defer the competition by the *Oceanic*." The *Oceanic*, it will be remembered, has been somewhat of a mystery ship. Laid down at Belfast, Ireland, several years ago, her plans being closely guarded, they were claimed to have been materially altered upon the appearance of the *Bremen*. Now it appears she is to be "deferred," whatever that may mean, but another report from London is that several of the greatest British ship-building firms have been invited by the Cunard

people to submit tenders for the construction of a giant express liner. While reticent on the subject of her speed, Cunard officials do not deny that something like a minimum of 28 knots is aimed at for this super-*Mauretania*. She is expected to be more powerful than the aircraft carriers U.S.S. *Lexington* and *Saratoga* and her passenger capacity is to be 4,000.

No additional plans for what are, for the present at least, designated as *Leviathan II* and *Leviathan III* of the United States Lines, Inc., have been made public. Nor has the French Line had much further to give out concerning the super-liner reported to be building at St. Nazaire. However, with April came the laying down of the keel of the *Rex* at Genoa. This 47,000-ton Italian offering is designed to compare favorably in speed with the *Europa* and the *Bremen*.

The arrival of the *Europa* at New York was given further significance by the announcement of a merger between the prewar rivals, North German Lloyd and the Hamburg American Line, in the form of a 50-year "commercial alliance," control of each company to remain with its present officers. This brings 444 ships of 2,446,750 tons into a formidable combination, the third largest mercantile unit in the world. First and second largest are British: the Royal Mail group (which includes the White Star) with 532 ships of 2,675,757 tons; and the "P. & O." group (Peninsular and Oriental Steam Navigation Company) with 437 ships of 2,492,018 tons.

Blue Nile Harness

ADVICES that final agreements have been signed between the British and Abyssinian governments whereby an American engineering firm, the J. G. White Construction Company, is to build the great dam to control the headwaters of the Blue Nile, indicate the settlement of a vexatious problem on which depends the future of Egypt and Sudan. This outcome was forecast in November, 1927, but by treaty, Abyssinia could not conclude the contract without Great Britain's approval. Action by the MacDonald Ministry guarantees the bonds to be issued by the American concern through agreement to pay water taxes for fifty years, control of the dam title to rest with the Abyssinians. Construction is expected to begin next October. Overcoming Britain's natural feeling that the award of such a large construction project should remain in the hands of her own nationals is a particular tribute to American engineering enterprise.

Egypt's fertility and prosperity depend upon the Nile, one main branch of which, the White Nile, is fed by the rains of the tropics and steadied in volume by receiving much of its water through vast head reservoirs, the large lakes of East Central Africa. Into this branch at Khartoum, the capital of the Anglo-Egyptian Sudan, and Omdurman, the former Mahdist capital, pours the discharge of the Blue Nile, clear and blue except when in flood. Then it becomes chocolate-brown from the mineral matter held in suspension, for its rate of flow increases often from 200 cubic meters per second to over 6,000. This latter figure is from four to six times that of the White Nile.

Down the river about 1,000 miles from Khartoum, at the head of the First Cataract, is the Assouan Dam, 6,400 feet long, which, since 1902 has impounded the waters to protect lower Egypt. It cost 3,000,000 pounds and between 1907 and 1912 it was raised

Ewing Galloway

LOWER PART OF A GREAT BLAST FURNACE AT YOUNGSTOWN, OHIO

Weyhe Galleries

FROM A LITHOGRAPH BY LOUIS LOZOWICK, PORTRAYER OF INDUSTRIAL SCENES

23 feet at a further cost of a million and a half pounds. Its present capacity is 2,400 million tons of water.

The country, El Gezira, enclosed in the angle between the White and Blue Niles is the most fertile portion of the Sudan and to develop it the Sennar Dam, on the Blue Nile about 200 miles above Khartoum, was completed in July, 1925, at a cost of six million pounds. As a reservoir its capacity is a fourth that of the Assouan Dam but its length, 9,900 feet, makes it the longest in the world. To supplement the Sennar Dam is the function of the projected dam near Lake Tsana (or Tana), for which the Blue Nile or Abbai, as it is known in Abyssinia, is the outlet.

Lake Tsana, in area about a tenth again as large as Lake Erie, is over a mile above sea level and the Abbai flowing from it drops over 4,400 feet in the 850 miles to its confluence with the White Nile. Three technical missions, the first in 1903, the second in 1916, and the last in 1920–1921, investigated the feasibility of using this lake as a reservoir to control the Blue Nile for the irrigation needs of the Sudan. They concluded that it was possible to provide a system of works to secure more even distribution of the water during the year and, in addition, store surplus water in years of heavy rainfall to form a reserve of 8,000 million cubic meters.

Abyssinia, visited in 1698 by a French physician and in 1769 by James Bruce, an Englishman who was looking for the sources of the Nile and who saw Lake Tsana, received little world-wide attention until its war with Italy under Emperor Menelik II, in 1895–1896. As a result of that conflict Abyssinia's absolute independence was recognized and treaties with other nations followed. Of these were one concluded with England in 1902 and the commercial agreement of 1903 with the United States. The first delimited the Sudan-Abyssinian frontier and by its terms Menelik agreed not to obstruct the waters of Lake Tsana or the Blue Nile without the agreement of Great Britain.

Abyssinian feeling that, if the Lake Tsana dam were to be an exclusively British proposition in its construction it might lead to British aggression, was supported by the present king, Ras Tafari, who obtained membership in the League of Nations for his country in 1923. Anxiety over the irrigation needs of the Sudan undoubtedly led the Labour Government of Britain to concede the point and yield assent to the building of the dam by Americans.

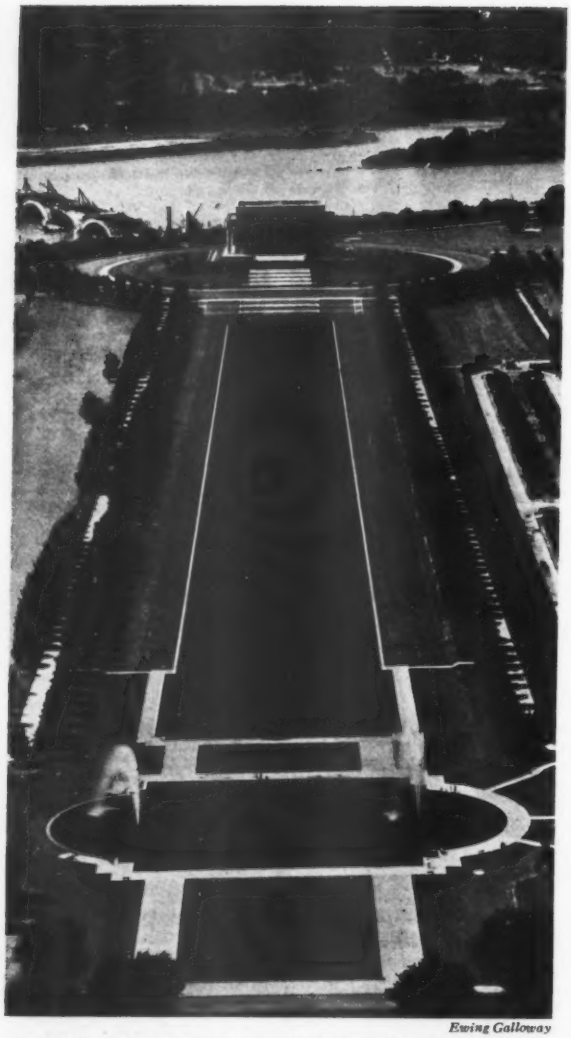
Columbus Memorial

DETAILED specifications of the conditions that will govern the second stage of the Columbus Memorial Lighthouse competition are to issue shortly from the permanent committee of the Pan-American Union. On the basis of these conditions the ten competitors who were successful in the original world-wide elimination contest, will submit entirely new designs for final judgment. Four of the ten are Americans: Will Rice Amon, '23; Helmle, Corbett and Harris; Donald S. Nelson, '26, and Edgar Lynch; and Douglas Ellington. Of the others, France has two and Germany, Italy, Spain, and England each have one representative.

The proposal to honor the memory of Columbus by the erection of a lighthouse on the coast of Santo Domingo, or Isla Española, took form at the Fifth Pan-American Conference in 1923 at Santiago, Chile. The international jury will meet in 1931 in Rio de Janeiro to make the final selection, the winner, in addition to being declared architect of the lighthouse will receive a prize of $10,000.

Preservation Victory

CONCLUDING a spirited political fight in Kentucky, scenery preservationists have triumphed in the contest to accept the offer of former Senator Coleman du Pont,



Ewing Galloway

LINCOLN MEMORIAL AS SEEN FROM WASHINGTON MONUMENT. BEYOND MAY BE SEEN A PORTION OF THE NEW ARLINGTON MEMORIAL BRIDGE. SEE PAGE 352

'84, to buy for his native state the site of Cumberland Falls as a public park. Passage of the bill by the Democratic-controlled legislature over the veto of Governor Sampson, a Republican, thus rids the Federal Power Commission, without action on its part, of a thorny issue which has been before it many months.

Cumberland Falls, except Niagara, is the largest cataract east of the Mississippi. Mr. duPont offered $230,000 to buy the Falls and 2,200 acres adjoining to form a public reservation. The Cumberland River, a large southern branch of the Ohio, meanders some 600 miles through Tennessee and Kentucky, above the Falls, mostly as a mountain stream of little volume in the dry months. At the Falls, which are in Whitley County, Kentucky, it drops precipitously 63 feet and then flows in rapids for ten miles through a gorge with cliffs 300 to 400 feet high.

Opposition to the acceptance bill, and to a companion measure giving the State Park Commission condemnation powers, for the property is now privately owned by the Cumberland River Power Company, came through the efforts of the Cumberland Hydroelectric Company, an Insull subsidiary, to obtain a Federal license to erect a power development at the Falls. Residents of the region are said to have favored the Insull proposition because of the industrial development which might ensue and there is, of course, the possibility that litigation may be attempted to contest the constitutionality of Kentucky's exercise of eminent domain.

Barring this, however, it seems that advocates of scenery have won as they did a year or so ago in the case of the Royal Gorge of the Arkansas River. As the *Electrical World* says, "Perhaps the moral is that developers of hydroelectricity must go slow in such locations, however strongly convinced they may be that power is not necessarily destructive of beauty."

Radium Decay

FEARS aroused by the experiments of one L. Bogojavlensky, indicating that the rate at which radium and allied substances decay into other elements may be made to change, have been allayed. For Madame Curie, who with her husband, Pierre, in 1902, discovered radium, has said she is unable to find any evidence to indicate such change is possible.

In short, radium is going right along decaying at the same old rate of 1,750 years for half a given quantity. It is the custom of scientists in expressing the disintegration of the elements of the radioactive series of uranium to speak in terms of the half-period, or the time required for the disintegration of half a given amount. And in this respect it is interesting to note that the time required for the change in the elements concerned varies from one-millionth of a second to eternity.

Out of the work of the distinguished English scientist, Sir Ernest Rutherford, and Frederick Soddy, one-time member of the staff of McGill University in Montreal, has come some understanding of the disintegration of the radioactive elements. When, for instance, radium emits helium there is produced another gas, radium emanation or radon. The latter, radioactive in its own right, undergoes still further disintegration. So radium, it seems, occupies an intermediate niche in a long series which begins with uranium and ends with lead. The latest market quotation on radium is $65,000 a gram.

Transatlantic Zeppelin Service

THE day when passengers may cross the Atlantic by airships operating on a regular schedule draws nearer with the announcement by Dr. Hugo Eckener, commander of the *Graf Zeppelin*, that organization of the International Zeppelin Transport Company has been completed. Details of operation are being worked out with the prospect that definite plans for transatlantic service will have been completed by the end of this year.

Paul W. Litchfield, '96, President of the Goodyear-Zeppelin Corporation of Akron, has been elected President of the new transportation company. That lighter-than-air transportation for long distances over the seas

holds very tangible commercial possibilities is indicated by the character of the organizations interested in the enterprise. Among them are the National City Bank of New York, the United Aircraft and Transport Corporation, the Union Carbide Company, the Aluminum Company of America, and the Goodyear-Zeppelin Corporation.

Some of the ships will be built in this country and others in Germany. The two great Navy ships now under construction at the plant of the Goodyear-Zeppelin Corporation at Akron will be 780 feet long with a helium gas capacity of 6,500,000 cubic feet.

Dr. Eckener indicated that some location in Spain, possibly near Seville, would be chosen as the European terminus of the proposed air line. Because of weather conditions on the Atlantic coast, he indicated that the American air terminal would necessarily have to be located no further north than Baltimore.

The fact that the United Aircraft and Transport Company already operates a subsidiary airplane line from Canada to Mexico, and from the Pacific coast to Ohio, indicates the possibilities of connecting air lines in this country, while in Europe there undoubtedly would be a similar arrangement providing quick transportation by airplanes to the leading capitals of the continents.

Weather Robots

AUTOMATIC weather stations, established on the lonely ice fields of the Arctic, and equipped to make their own observations and transmit them three times a day, are proposed by Dr. Fridtjof Nansen, leader of the International Society for Exploration of the Arctic Regions.

Under Dr. Nansen's plan these meteorological robots would be set up by aircraft at widely separated points on the Arctic ice fields. The instruments would be designed to work without human attention for a year, making three daily broadcasts of meteorological conditions.

Such a proposal is an indication of the increasing recognition being given to the subject of meteorology as it affects aeronautical commerce. The United States, despite the strides made in special studies for the benefit of air travel, still lags behind Europe in certain fundamental aspects of meteorological research. Dr. Carl-Gustaf A. Rossby, who is in charge of the Course in Meteorology at the Institute, has urged the need for establishing weather stations at very close intervals across North America.

Volume of Research

EXCLUSIVE of college, university and Government laboratories or control and testing laboratories, there are now about 33,000 research workers in the United States apportioned among 1,000 laboratories. Each year their expenditures total about $210,000,000. For these figures Dr. H. W. Gillett, writing in *Industrial and Engineering Chemistry* stands sponsor. However, statistics of the amounts expended in the research activities of the nation are largely guesswork, he states, as is the estimate that less than a tenth of the workers and about a twentieth of the money goes for pure science, the rest being for applied science.

The difficulty in obtaining accurate figures is illustrated by Dr. Gillett when he says, "The dividing lines between research in pure science, industrial research, development work, plant 'trouble-shooting,' attention to customer complaints, and routine analysis and inspection are so hazy that, without a census in which all items of so-called research are clearly classified, one is at sea in guessing the extent of research."

Ewing Galloway

FOCAL POINT OF PHILADELPHIA'S "CULTURAL CENTER," THE $13,000,000 MUSEUM OF ART

THE INSTITUTE GAZETTE

Inauguration

PLANS for a brief and dignified ceremony inducting Dr. Karl Taylor Compton into the Presidency of the Institute are now being formulated by a joint committee of the Corporation, Faculty, and Alumni. The exercises will be held outdoors in Eastman Court at 3 P.M., on Friday, June 6. Delegates and members of the academic procession will be seated on a platform erected in front of the main portico, the addresses of the speakers being conveyed to all portions of the Court by means of a public address system.

Invitations to all former students will be mailed about the middle of May as the Committee on Inauguration is desirous of early acceptances to aid in the seating arrangements. Allotment of alumni seats will be in the order of receipt of acceptance.

The selection of Eastman Court makes it possible to care for all Alumni and guests who wish to attend. This number, it is indicated, will greatly exceed those who could be admitted to the inauguration of Dr. Stratton held seven years ago in Symphony Hall, for the alumni body today is nearly 3,000 larger than it was in 1923 and the coincidence of the Reunion will bring many to Cambridge who might not otherwise be present.

The first thought was to transfer the exercises to Walker Memorial in the event of rain, but the inadequate facilities caused this to be abandoned. If the weather is unfavorable, those on the platform will be shielded by a canopy, the audience witnessing the ceremony from the portico and the windows facing the Court, from which vantage points the speeches will be clearly audible because of the public address system.

The inaugural exercises will be preceded by an academic procession formed near the entrance to Eastman Court, there to await the coming of President Stratton and President-Elect Compton, who will be escorted from the President's house by the members of the senior class. Those in the academic procession, which will include members of the Corporation and Faculty as well as the invited delegates of universities and scientific societies, will wear academic dress as will the speakers and the senior class.

TO BE PRESIDENT OF THE ALUMNI ASSOCIATION FOR 1930–1931: THOMAS C. DESMOND '09. HE IS ALSO CO-AUTHOR OF THE ARTICLE ON PAGE 350 AND CHAIRMAN OF THE REUNION COMMITTEE

Following the invocation, it is planned to have five brief addresses, the total time of these speeches not to exceed forty-five minutes. First will come Dr. Stratton, followed by Dr. Compton. President John Grier Hibben of Princeton will then convey the congratulations of the university of whose faculty Dr. Compton has been a member for seventeen years. President A. Lawrence Lowell of Harvard will express the greetings of New England educational institutions and a final speaker, whose tentative acceptance has been received, will represent the scientists and educators of foreign countries.

The committee on the Inauguration, of which Walter Humphreys, '97, Secretary of the Corporation, is chairman, and Horace S. Ford, Bursar of the Institute, is secretary, consists of: *From the Corporation*—Charles T. Main, '76, Henry A. Morss, '93, Salmon W. Wilder, '91, and Maurice R. Scharff, '09; *From the Faculty*—Samuel C. Prescott, '94, Allyne L. Merrill, '85, Harold E. Lobdell, '17, William Emerson, William P. Ryan, '18, and Colonel Robert C. Eddy; *From the Alumni Association*—James W. Rollins, '78, Willard H. Watkins, '95, Donald G. Robbins, '07, Harold B. Richmond, '14, and Harrison P. Eddy, Jr., '17. This committee at its first meeting elected Alexander Macomber, '07, as Chief Marshal, and added the following to its membership: Harry W. Gardner, '94, Edward L. Bowles, S.M., '22, and John J. Rowlands.

Commencement Orator

SIR WILLIAM H. BRAGG, one of England's most distinguished scientists, and internationally known as Director of the Royal Institution of Great Britain, will be the commencement orator at the graduation exercises to be held on June 10.

Since 1923, he has been Fullerton Professor of Chemistry in the Royal Institution, and Director of the Davy-Faraday Research Laboratory. He is an honorary Fellow of Trinity College, Cambridge, and in 1915 he, in conjunction with his son, W. L. Bragg, was awarded the Nobel Prize for studies on x-rays and crystals. The honor of the Rumford Medal of the Royal Society came to him in 1916, and in the following year he and his son were awarded the Gold Medal of the *Societe Italiana della*

A Message from President-Elect Compton

Alumni and Friends of the Massachusetts Institute of Technology:

I AM HAPPY for this opportunity to respond to the welcome which you have extended to me through The Technology Review, and to tell you with what genuine pleasure I am looking forward to joining you in the work of the Institute.

In its essentials this work may be simply stated to be "the development of science and its useful applications." The program of this work involves those attempts to understand Nature which we call research, those efforts to persuade Nature to serve our purposes which we call industrial development, and, above all, the training of men who will take the lead in further extending this program. The program is of such fundamental importance to civilization as to compel the adherence and support of all thoughtful men. It is a program in which we, who belong to the more inquiring or practically-minded classes, must take the lead. I join you in this program with enthusiasm for its importance and confident of your support in every effort to make the Institute still more effective in the pursuit of knowledge and the practical applications of knowledge to life.

In carrying forward this program you will still have the leadership of Dr. Stratton, whose experience, judgment, and intimate knowledge of the problems of the Institute are invaluable. I have been happily associated with him for many years in various scientific societies. His desire to have me coöperate with him in the administration was a major consideration in my acceptance, and I am convinced that the new administrative arrangement will be personally a happy one just as I believe that it is, in principle, a wise one.

As I become more intimately acquainted with the Institute and its work and its problems, I shall at the same time become personally acquainted with you, who so splendidly represent the Institute throughout the world. Looking forward to this closer relationship, I am,

Most cordially yours,

(*signed*) KARL T. COMPTON

Scienze. In 1914, Brown University conferred upon him the honorary degree of Doctor of Science, which has also been awarded him by the University of Manchester, Leeds University, Trinity College, Dublin, University of Pennsylvania, Oxford University, and Bristol University.

New Dormitories

GROUND was broken, on March 24, for the west wing of the dormitory quadrangle. This new building, consisting of three connected units, will provide accommodations for 200 students and in its design represents great advances in college dormitory facilities.

The location of the new wing, to the west of its existing companion building, is directly behind the Walker Memorial building on that part of the Institute grounds which borders on Ames Street. The architects are Coolidge and Carlson, and construction will be carried on under the direction of Harry J. Carlson, '92, head of the firm.

The building will be more than 300 feet long, some 40 feet wide, and five stories in height. Construction is now under way and the building will be ready for occupancy this autumn. Technology will then have dormitory accommodations for 620 of her 3,000 students. The head house, which eventually will close the north end of the quadrangle, formed by the two wings, remains to be built in the future.

One of the most interesting features of the new dormitory, which will be built of cream-colored brick with limestone trimmings, is a large commons room to be furnished after the manner of a colonial inn, with a great fireplace, appropriate wall paper of the period, and comfortable chairs and lounges. The room has been designed to permit its conversion into bedrooms or studies if such a change is necessary in the future.

The radio facilities, believed to be the first of their kind installed in any college dormitory, consist of a new system of individual outlets in every room, making it possible to employ a master antenna giving a wide selection of stations.

Plans for the new dormitories show the Grecian style characteristic of all the Technology buildings. The west façade of the central section will be broken by fluted pilasters surmounted by a latticed parapet with decorations in the Grecian urn motif. The six entrances to the new wing will be much larger than those in the existing building, and on each side of the entrances will be stone seats.

The interior of the building will be furnished in birch, painted in colors to harmonize with a decorative plan now being worked out. At the south end of the building, on the ground floor, will be offices for the administrative staff, with a post office and laundry delivery service. On the upper floors at this end of the wing will be a number of suites, each with living room and two bedrooms overlooking the Charles River Basin. An intercommunicating telephone system will connect every room through a private exchange, and there will be a number of conveniently located public telephones. Other features will include waste paper chutes leading from every floor directly to an incinerator. There will also be linen chutes and other conveniences to add to the efficiency of maintenance.

NEW DORMITORY QUADRANGLE, OF WHICH THE LEFT WING IS NOW UNDER CONSTRUCTION, THE RIGHT FINISHED, AND THE CENTER PROJECTED FOR THE FUTURE, SEE PAGE 365

Every room will be furnished with a bed, a chiffonier especially designed for men, a desk and two chairs, bookcase, waste paper basket, reading lamps, a clothes closet, and a lavatory. These features are standard in all Technology's dormitories. Students coming to the Institute need bring nothing more than is necessary in a good hotel, for the rooms are completely furnished with all linen, towels, soap, and even a special lamp for shaving. All walls are specially processed with canvas so that the occupants may place their decorations without injuring the plaster. The new building will be connected with its opposite wing by an underground tunnel to facilitate service operations, and the grounds between the buildings will be landscaped with lawns and evergreens.

Among the unique features in the construction of the new units is the use of the latest methods of floor construction. The beams will be of the type known as junior steel beams extending the full span from wall to wall and spot welded at each end to the girder beams. These beams will then be covered with a high rib metal lath upon which the floor slabs of concrete may be poured without the necessity of any forms. Another departure from the usual methods of construction is that, although the building will to all intents and purposes be one structure, it will in reality be divided into three separate units connected by mastic joints. By this method the normal settlement expected in all buildings will cause no unsightly inequalities of elevation.

145th Council Meeting

ON MARCH 24, the Alumni Council and Faculty Club held a joint meeting at Walker Memorial, an annual event to discuss problems of mutual interest. To lighten the customary routine business, the reports of the Secretary and Treasurer were dispensed with by a statement from the Chair. Under reports of committees, Allan W. Rowe, '01, recounted the progress made in studying the question of changes in the method of voting for officers of the Alumni Association and for Term Members of the Corporation. This report was thoroughgoing and far-reaching in the scope of material presented. It recommended a reorganization of the entire Alumni Association and the creation of a new electoral congress to be composed of Technology graduates residing in various sections of the country. At a later date this proposed plan will be submitted in detail to the entire alumni body for approval. This committee, to study the problem of reorganization of the Alumni Association, consisting of Dr. Rowe, chairman, Charles W. Aiken, '91, Francis J. Chesterman, '05, Bradley Dewey, '09, and Francis E. Stern, '16, by vote of the Council is to continue its work.

Reporting for the committee consisting of Isaac W. Litchfield, '85, Frank L. Locke, '86, and Thomas B. Booth, '95, to draw up resolutions on the deaths of Henry F. Bryant, '87, Walter B. Snow, '82, Edward W. Rollins, '71, and Wallace C. Brackett, '95, the Secretary, Laurence P. Geer, '15, read the following:

Henry F. Bryant: "In the death of Henry F. Bryant of the Class of 1887, Technology recognizes the loss of a worthy Alumnus, and this Association mourns a devoted member.

"Classmates, neighbors, and associates in business or in service to his fellows, will long remember him as a loyal, faithful friend and co-worker. In all his relationships, whether in social and civic or business and professional affairs, Henry F. Bryant gave time and effort without reservation, and proved true to every trust imposed upon him.

"With a fine sense of the duties of citizenship, he was active in the local interests of his home in Brookline. He was prominent in the affairs of the Unitarian Church, of which he was a member. To the Boston Society of Civil Engineers he gave loyal and earnest service, and in addition to membership on important committees he was honored by election to the offices of Vice-President and President.

"His contributions to Technology as Vice-President of the Alumni Association, as a member of the Alumni Council, as chairman of the Dormitory Fund Committee, and as a member from time to time of other special committees, were always rendered with painstaking attention and faithfulness.

"The Alumni Council of the Massachusetts Institute of Technology hereby records its appreciation of a fellow Alumnus and of his quiet, unostentatious service to his Alma Mater."

Walter C. Brackett: "To his many friends, fellow Alumni, classmates, and business associates the death of Wallace C. Brackett, '95, at New York City, on October 14, 1929, came as a profound shock and brought a sense of deep personal loss.

"With his business career divided between Boston and New York, his large and constantly growing circle of friends in both localities included innumerable Technology Alumni, to whom he endeared himself by his geniality, warm-hearted enthusiasm, and generosity, and whose great respect he universally commanded and held through his high ideals, loyalty, charming manner, and uprightness.

"A faithful member of the Alumni Council for a number of years, his ability was early recognized. As a member of the Executive Committee of the Alumni Association, All-Technology Reunion Committee of 1925, and numerous other committees, he was assigned and performed successfully many difficult tasks. To these he gave his time and services generously and without stint. To them he brought unbounded enthusiasm, keen judgment, freshness of vision, and a strikingly practical point of view.

"Serving for many years as the Secretary of the Class of 1895, prominent at all times in its activities, and keenly alive to the desirability of preserving and fostering social relationships, he held the warm personal affection and will always command the grateful memory, of each of its members.

"The Alumni Council of the Massachusetts Institute of Technology takes this opportunity of expressing its deep sense of appreciation of his high personal character and the value of his devoted services to the interests of Technology."

Edward W. Rollins: "The death of Edward W. Rollins, '71, in October, removed one of the few remaining representatives of the Old Guard, members of the first four classes who worked together under the same roof when the Rogers Building was new. After graduation he became identified with the business and social life of Denver, Colo., where he was prominently connected with the development of the city and state, both in engineering and financial channels. On the death of his father he returned to New England to associate himself with the banking house of E. H. Rollins and Sons Company, of which he became the head, and took up his residence near the ancestral home at Dover, N. H. His family had taken an important part in the history of that state. His father was Senator Rollins and his two brothers, who passed on before him, were men of prominence and graduates of the Institute. One was the Hon. Frank W. Rollins, Governor of New Hampshire, and the other was Montgomery Rollins, financial author and banking analyst.

"'Dad' Rollins, as he was familiarly called, had a profound admiration for Technology and the practical accomplishments of its former students. Each year in June, for a dozen years or more, he invited to his hospitable establishment at Three Rivers Farm, the Technology Alumni of Maine, New Hampshire, and Vermont, as well as a large delegation from Massachusetts, and here, after a generous spread in the shade of majestic pines, one was privileged to listen to an unusually happy symposium of speeches from Technology officials, prominent guests from all parts of the country, and representatives of sister institutions. This annual convocation was so unusual in its democracy and good fellowship that it created an atmosphere and an inspiration all its own and was always anticipated with keen pleasure. It was far

SCENE OF THE INAUGURATION IN JUNE. EASTMAN COURT DURING THE DEDICATION EXERCISES IN 1916

ALUMNUS BENEFACTOR WHO RECENTLY DIED: CHARLES A. TRIPP, '93. SEE THE MEMOIR AT THE RIGHT

more than an afternoon's entertainment; it was a renewed pledge of faith in the Institute. Mr. Rollins was Secretary of the Class of '71; was a Term Member of the Corporation; and had long been President of the New Hampshire Association.

"His private benefactions were numerous and widespread, but it was to his home town of Dover that his sympathies were chiefly drawn. It was a very faint call for help that he failed to hear if it came from that quarter. Among his larger gifts to the town were the new hospital and the children's summer home on Parker Mountain.

"Mr. Rollins was a man of wide culture and travel. He was inherently an investigator and took a lively interest in the varied matters that came to his attention, particularly if they pertained to science or industry. His retentive mind was a reservoir of exact information, and his advice on any matter was well worth having. Above all, he had a saving sense of humor and a vast fund of interesting reminiscences which made him always a most agreeable companion."

The resolution prepared for Walter B. Snow, '82, was published in the April issue of The Review. During the reading of these resolutions the assembled group of Faculty and Alumni Council members remained standing as a tribute to these four outstanding men.

Included among the guests of the evening was Thomas C. Desmond, '09, Chairman of the 1930 All-Technology Reunion Committee, who outlined Reunion plans to make June 6 and 7 memorable days for all Technology men.

At this point in the agenda of the evening, Harold B. Richmond, '14, Vice-President of the Association and the presiding officer, turned the meeting over to Harry W. Tyler, '84, President of the Faculty Club, who introduced Edmund E. Blake, '31, chairman of an undergraduate committee of the Institute Committee to study student conditions at Walker Memorial. In a manner highly commendable to a man many years his senior, Mr. Blake presented salient facts concerning the congested conditions now existing in the present dining, lounging, recreational, and extra-curricular activity facilities of Walker Memorial. (See page 373.)

With the aid of lantern slides, Harry J. Carlson, '92, who was next introduced by Dr. Tyler, showed plans of an enlarged Walker Memorial which would eliminate the congestion pointed out by the students and would provide for the future growth of the Institute's enrollment. His plans for future building projects also included the construction of a Faculty Club House, the need for which was stressed by Professor John W. M. Bunker of the Department of Biology and Public Health.

Fifty-seven members and guests were present.

Charles A. Tripp, '93: 1870–1930

CHARLES ALBION TRIPP, '93, for many years a technical expert and official of the United States Flashless Powder Company, died at his home in Wilmington, Del., on February 11. In his passing, Technology has lost a loyal Alumnus; one whose life work exemplified the worth of her training and brought credit to his Alma Mater. His achievements, his personality, and his devotion to the Institute, as shown by the bequest which he has made, mark him as one of Technology's outstanding sons and one whose accomplishments are worthy of record as an inspiration to others.

He was born in Hudson, Mass., on November 7, 1870, and entered the Institute in 1889 as a freshman in the Class of 1893. He was graduated with the Class in Electrical Engineering. Shortly after graduation, Mr. Tripp and seven other classmates entered the employ of the Westinghouse Electric and Manufacturing Company at Pittsburgh. This was in the early days of electrical engineering and before that company's new factory was built at East Pittsburgh. Of this '93 group, including, besides Tripp, Charles V. Allen, Frederick W. Hadley, George T. Hanchett, Harry N. Latey, Herbert Lewis, Heiichiro Maki, and Percy H. Thomas, only Allen still remains with the company. Tripp spent three years with Westinghouse: six months in the shops; a year and a half in the engineering office on motor design; and a year on installation of street railway equipment. In recalling him during this period, Mr. Allen writes, "While with Westinghouse, Tripp made some most valuable suggestions bearing on and resulting in patents." This is the first evidence we have of the inventive bent which was developed in him to a marked degree in later life. Concerning Tripp during these early years at Pittsburgh, Thomas says, "He was practical minded and energetic as well as having plenty of originality and initiative — almost a genius in his way. He was fond of out-of-doors and knew most of the walks and woods around Pittsburgh and Allegheny."

Leaving the Westinghouse Company in 1896, Tripp served for two years as manager of the Municipal Light and Power Plant of his native town, Hudson, Mass. During this time he built the first unit of the present

station, a unit which is still functioning as he built it. He resigned his position at Hudson in 1898 to become associated with A. Farwell Bemis, '93, in the work of the Bemis Bro. Bag Company.

Tripp's employment as engineer by the Bemis Bro. Bag Company, extending for five years between 1898 and 1903, marked an important change in that company's managerial and research policy. It was the first step toward unified engineering control of plant and mechanical operation. He had a very difficult position to fill in the resulting personnel problems in addition to a maze of physical or mechanical problems. Throughout he handled the work with tact and with the pronounced ingenious mechanical ability which his entire record has evidenced.

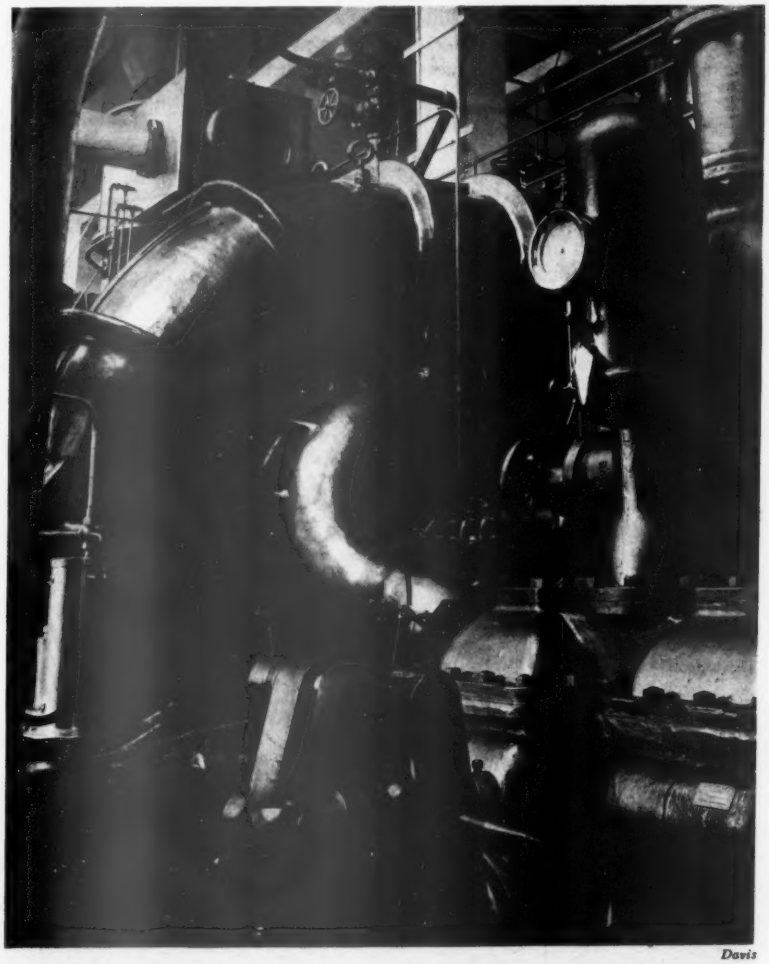
Along with the large number of miscellaneous minor accomplishments during this term of service, Tripp carried through to successful termination a study of methods of cutting, printing, and folding cloth from the web, resulting in patented machinery for performing these operations. Whereas the patent obtained on the process and machinery was not "basic" in its character, nevertheless the claims proved sound and the devices practically effective and the process is still largely used by the company in the design of its machinery and its manufacture and methods.

In 1900 the plant of the Bemis Bro. Bag Company at Jackson, Tenn., was under construction, and on this work Tripp had as his assistant, George R. Wadleigh, '97, who has written interestingly of their work together at Jackson. He writes, "We boarded in different houses with two old Southern families, and used to drive out to work over some four miles of muddy road in the morning, and get back to the house by seven in the evening. Under these circumstances we got to know each other very well indeed." Tripp was extremely conscientious, and contrary to Southern custom, always insisted upon punctuality and faithful attention to work. As evidence of Tripp's fertile ingenuity, Wadleigh says: "The boilers for this plant were the Cahall vertical water-tube. The water level was some thirty feet above the ground, and it was very difficult to read the water gauge. We decided that a gauge could be worked out that could be read from the floor readily. Through the use of an inclined mercury column we devised such a gauge, patented it, and sold a few. This was a year or two later after the mill was in operation.

"After the construction of the Tennessee mill was completed, Tripp used to visit there once or twice a year, and after he left the Bemis company and was living in Indianapolis I would always visit him on the occasion of my trips to that city at his home on Woodruff Place. He was a very early owner of an automobile. I don't know that he ever had a 'one-lunger,' but I think he had a two cylinder machine. He certainly got a lot more pleasure out of taking it apart than he ever did in running it."

While with the Bemis Bro. Bag Company, Tripp made his headquarters mainly at Indianapolis. There he became quite intimately acquainted with a young engineer named McMeans. As a result of this acquaintance, certain very promising opportunities opened for him in association with McMeans. He decided to leave the Bemis Bro. Bag Company, and in 1903 established the firm of McMeans and Tripp, consulting and mechanical engineers, in which new relationship he continued his inventive mechanical accomplishment thus well started with the Bemis Bro. Bag Company.

Very soon after the new firm of McMeans and Tripp had opened its office, an opportunity came to develop a series of new machines for use in canning factories. The large canning plant owned and operated by the originator of these machines burned to the *(Continued on page 408)*



Davis

GREAT CENTRIFUGAL PUMP IN THE INSTITUTE'S LABORATORY OF STEAM AND HYDRAULIC ENGINEERING. THIS LABORATORY AND ALL OTHERS WILL BE OPEN FOR INSPECTION ON JUNE 6

THE REUNION BULLETIN

Reunion Plans in Review

THE happy circumstances which make it possible to hold the inauguration of Dr. Karl T. Compton as President of Technology on Friday, June 6, the opening day of the All-Technology Reunion, will not only give everyone an opportunity to witness the impressive and colorful ceremony of that important event, but also to meet the Institute's new President. (See Page 364.)

Before the inauguration, which will be held in mid-afternoon, the Alumni will have an opportunity to inspect the buildings and laboratories of the Institute which will be given over in its entirety to a scientific exposition specially arranged for the pleasure of those who come back to renew old friendships and to witness the progress of Technology since their student days. At 12:30 P.M. there will be luncheons at Fraternity Houses (See Page 371) and a general luncheon at Walker Memorial. Following the inauguration, Dr. Stratton and the Corporation will hold a reception at which Dr. Compton will meet the Alumni.

On Friday evening the various classes will hold their dinners. Those ladies not attending class dinners are specially invited to attend the banquet of the Technology Women's Association at the Hotel Statler. This dinner marks the thirtieth anniversary of the Association and will have many particularly interesting features, including a dance after the dinner.

The great outing of the Reunion comes on Saturday, June 7, at the New Ocean House at Swampscott, Mass., on that delightful bit of New England's picturesque coast to which Calvin Coolidge came to seek of rest and recreation during his administration in the White House. Here, with all the comforts of one of the largest and most modern summer hotels, with surf bathing on a wide sandy beach, will be found a most fitting spot for a day of sports, contests, and good fellowship. The cold, clear North Atlantic will undoubtedly make generous contributions of its most toothsome products for the luncheon by the sea. Aside from this purely gastronomic feature, there will be events, including a bridge tournament for the ladies, to meet every desire for good fun and recreation. As explained below, special busses will take everyone to and from the outing on a convenient schedule arranged particularly to meet the demands of the day.

Class costumes are encouraged. In fact, it is urged that every class make a special effort to present its members, long, lean, short or stout, in colorful and original costumes, for the pleasure of all concerned.

The great dinner (formal dress!) that officially marks

JOHN BELLAMY TAYLOR, '97, (RIGHT) AND SOME OF THE APPARATUS HE WILL USE FOR HIS AUDIBLE LIGHT DEMONSTRATION AT THE GRAND BANQUET ON THE EVENING OF JUNE 7

M. I. T. Photo Service

THE INSTITUTE IN EVENING DRESS. THE ENTIRE CAMBRIDGE PLANT WILL BE ILLUMINATED FOR ALUMNI ON THE EVENING OF JUNE 6

the close of the Reunion will be given in the Hotel Statler on Saturday evening following the return of the Alumni from Swampscott. Dr. Stratton and Dr. Compton will make addresses, and there will be an unusual scientific demonstration of "audible light," a spectacular and interesting experiment in "narrowcasting" which will be carried out by John Bellamy Taylor, '97.

The blanket ticket covering all these events, including the outing and the great banquet, will cost but $10.00 and separate tickets for the outing or the banquet are obtainable at $5.00 each. All inquiries about the Reunion should be addressed to Headquarters, Room 3-207, M. I. T; applications for tickets to Room 3–106.

Boat Trip and Reduced Railroad Fares

AS announced in the last *Reunion Bulletin* convention fares on the certificate plan are expected to apply to those attending the Reunion. Through such a privilege, if sufficient certificates are secured, the return trip by the same route would be secured for half-fare by all persons who purchase a certificate. ***It is important, therefore, that every person attending the Reunion secure from his local railroad agent a certificate at the time he purchases his transportation.*** In this manner the privilege of the special rate of half-fare for the return trip can be secured. Local railroad agents are receiving advance notice of the reduced fares about May 1.

The complete train schedules and routes of those attending the Reunion was published in the March *Reunion Bulletin*. References to these carefully worked out official routings will simplify the making of plans for reaching Boston.

Alumni expecting to travel by boat from New York to Boston on the night of June 5 should make their reservations immediately with Robert J. Marlow, Room 3211, 120 Broadway, New York City. The entire accommodations of the S. S. *New York* of the Eastern Steamship Lines have been reserved and a special program of entertainment has been planned. The boat leaves Pier 19, North River, at 5 P.M. Daylight Saving Time.

All of the schedules arranged by the Transportation Committee converge in New York in time to permit catching this boat.

Fraternity Luncheons

HAMILTON L. WOOD, '17, in charge of Fraternity Luncheons, planned for 12:30 P.M., Friday, reports the following chapters as having definitely arranged for luncheons: Alpha Tau Omega, 37 Bay State Road, Boston; Beta Theta Pi, 241 Kent Street, Bookline; Chi Phi, 44 The Fenway, Boston; Delta Kappa Epsilon, 403 Memorial Drive, Cambridge; Delta Tau Delta, 255 St. Paul Street, Brookline; Delta Upsilon, 526 Beacon Street, Boston; Lambda Chi Alpha, 441 Beacon Street, Boston; Phi Beta Epsilon, 400 Memorial Drive, Cambridge; Phi Gamma Delta, 28 The Fenway, Boston; Phi Kappa Sigma, 530 Beacon Street, Boston; Sigma Alpha Mu, 338 Bay State Road, Boston; Sigma Chi, 532 Beacon Street, Boston; Sigma Nu, 259 St. Paul Street, Brookline; Theta Chi, 528 Beacon Street, Boston; Theta Xi, 66 Bay State Road, Boston. Ladies are invited to all of these luncheons.

Information About Class Dinners

OF the many class dinners planned for Friday evening, definite information about the location of the following is available: classes from 1868 to 1880, inclusive, (except 1873) Joint Dinner — in charge of J. W. Rollins, '78, Algonquin Club; 1873, Hotel Bellevue; 1881, University Club; 1884, University Club; 1887, University Club; 1889, Union Club; 1892, Boston City Club; 1893, Eastern Yacht Club, Marblehead; 1894, Hotel Kenmore; 1896, Copley Square Hotel; 1898, Grill Room, Walker Memorial; 1899, Walker Memorial; 1901, St. Botolph Club; 1902, University Club; 1904, Brae Burn Country Club; 1905, Hotel Sheraton; 1906, Winchester Country Club; 1907, Charles River Country Club; 1909, The Sheraton; 1908, Belmont Springs Country Club; 1910, American House; 1911, University Club; 1912, Brae Burn

THE BEAVER AS IT APPEARED AT THE 1916 REUNION

Country Club; 1913, Parker House; 1914, Engineers Club; 1915 and 1917, Corinthian Yacht Club, Marblehead; 1916, Hotel Statler; 1918, Engineers Club; 1923, University Club; 1926, Engineers Club; 1928, University Club. Practically every class, it is expected, will hold a get-together, and members of classes not listed above are urged to get in touch with their Class Secretaries in order to obtain information. Course members will have the opportunity to meet together during the course assemblies Friday morning at the Institute.

Hotels and Transportation

TO assure all Alumni returning to Boston on June 6 and 7 adequate hotel accommodations, the Committee on Hotels and Housing has selected the Brunswick, Copley-Plaza, Lenox, Statler, and the New Ocean House as the Hotels which will render Technology men the best service.

Rates are as follows — HOTEL BRUNSWICK: Single with bath, $3.50, $4.00, $4.50, $5.00; Twin beds, with bath, $6.00, $7.00, $8.00. COPLEY-PLAZA: Single with bath, $4.00, $4.50, $5.00, $6.00; Twin beds, with bath, $7.50, $8.00, $9.00, $10.00, $11.00, $12.00. LENOX: Single with bath, $3.50, $6.00; Double with bath, $5.00, $8.00. STATLER: Single with bath, $4.00, $4.50, $5.00, $6.00; Double with bath, $6.50, $7.00, $8.00, $8.50, $9.00.

Although these four hotels have signified their intention of giving Technology men preferences on reservations around June 6 and 7, the Committee urges that reservations be made early.

Guest privileges at the University Club have been extended to Technology men who will attend the Reunion. Accommodations are limited. All inquiries should be sent to the Club Manager.

Alumni desirous of hotel accommodations outside of the city limits will find the New Ocean House at Swampscott a delightful place. The rates per person, based on the American Plan, are as follows: Single room with bath (limited number) $10.00 per day; Double room with bath $8.00 and $9.00 per day; Rooms with 3 beds and bath $7.00 per day.

Promptly at nine o'clock on the morning of Saturday, June 7, Boston and Maine Railroad busses will drive up to the doors of the official hotels and take on passengers for the outing at the New Ocean House, Swampscott. These busses will move on railroad schedule and there will be no waiting or delay. They will all proceed to the New Ocean House, together with police escort. When the busses leave the New Ocean House, they will be labeled for the various hotels so that the attendants will be able to ride directly to their stopping place.

AT THE 1925 REUNION: STANDARD BEARERS FOR 1868, 1873, 1874, 1875, AND 1876. ROBERT H. RICHARDS, '68, HERE SHOWN, WILL CONDUCT THE ARCHERY CONTEST AT SWAMPSCOTT. HE ANNOUNCES THAT THREE ARCHERY PRIZES WILL BE GIVEN: ONE TO THE WOMAN WITH THE BEST RECORD, ONE TO THE MAN, AND ONE TO A GROUP. THOSE WHO EXPECT TO SHOOT ARE ADVISED TO BRING GLOVES, PREFERABLY BUCKSKIN

Wives are Invited!

THE Reunion Committee strongly feels that the success of the Reunion largely depends upon a number of wives of Technology Alumni being present. Every effort is being made to make the Reunion even more entertaining for them than for their husbands. Gretchen A. Palmer, '18, who has charge of this portion of the program has outlined for the *Bulletin* special features that will appeal to women.

After spending Friday with the husbands, visiting the scientific exposition at the Institute, attending the inauguration, and then the reception at the President's house, the wives will then have something of a vacation. While the men are attending their class dinners, all the wives will convene at the Hotel Statler at 6:45 for a dinner given under the auspices of the M. I. T. Women's Association. There will be a program of professional entertainment, and the sponsorship of the Women's Association will insure a cordiality of the highest order.

By 10:00 P.M., the class dinners will be over and the husbands are expected to come to the Statler for a dance.

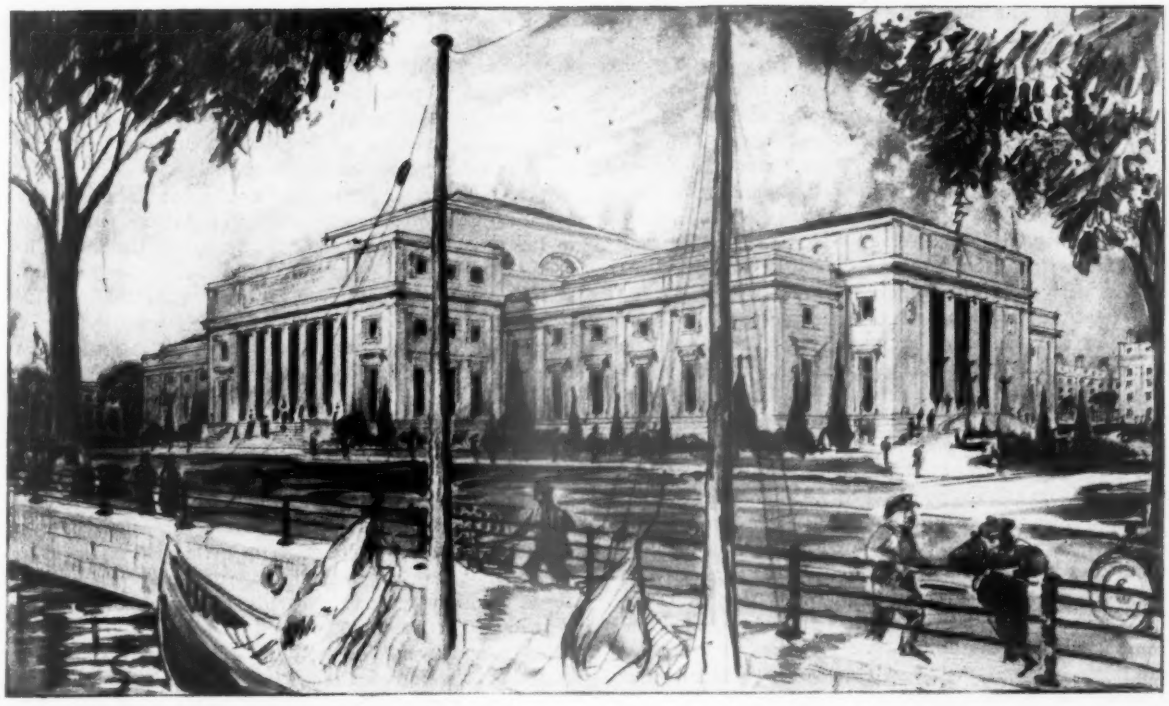
It happens that this same date coincides with the thirtieth birthday of the M. I. T. Women's Association, and so it is expected that it will be doubly a gala occasion. Maybe there will be a birthday cake!

Saturday is just as much a day for the ladies as it is for the men. They can enter all the sports they wish during the outing, and in addition to that a bridge party will be held on the porches of the hotel. There will be a prize at each table. Of course women will be an essential part of the grand banquet Saturday night.

Prizes and Features

THE Committee on Prizes and Features of which Edward B. Rowe, '06, is Chairman, reports that (*Concluded on page 412*)

GEORGE L. GILMORE, '90, TREASURER OF THE FORTHCOMING REUNION, AS HE APPEARED IN 1925



AN ADEQUATE STUDENT UNION

The Limitations of Walker Memorial and Plans for Its Enlargement

From a Report Prepared by a Committee of Undergraduates

Composed of Wilfred F. Howard, '30; D. Tullis Houston, '30; E. Ralph Rowzee, '30; and Edmund G. Blake, '31, Chairman

FOREWORD

By Allan W. Rowe, '01

THE following report is a plea for changes in the Walker Memorial which will allow the building more nearly to realize the purposes for which it was designed. With the shy hesitancy that characterizes undergraduate psychology of today, the really parlous state of affairs is but dimly portrayed. The gymnasium at the top of the building, for example, houses during a single hectic hour a squad of young men under the genial guidance of Mr. McCarthy, indulging in that occult diversion known as corrective gymnastics. On the same floor and at times hopelessly interwoven with the gymnastic squad, the fencing team is attempting to develop that skill which allows them to kill an opponent expeditiously and in perfect form. The air above is filled with the flying arms and legs — to say nothing of the occasional solid bodies — of the competitive gymnastic squad, a very different group from that whose work is corrective.

Medicine balls hurtle through the air at times, caroming from the lissome form of the flying ring specialist, at times impaling itself on an active foil, and at yet others coming in violent contact with the more tender portions of human anatomy unduly obtruded by the exigencies of gymnastic exercise. Small groups of freshmen with shouts of boyish glee add a pleasing juvenile note to the picture as they think they play basketball. Our wrestlers and boxers, it is true, have been removed but there remains enough of a remnant of the various activities to produce lifelike replicas of the Laocoön, a veiled recognition of one proviso of the Cilley bequest. And all of this is but one restricted area. In the rooms of the publications the literary aspirants stand — and lie — thicker than the leaves in Vallombrosa, and the performance of minor acts of personal hygiene by the individual can be encompassed only by synchronized movement of the entire group. Even that pampered child of fortune, the Christian Association, through force of contact has developed belief that it, too, is crowded.

All of these and many other pertinent facts being true, it behooves the interested Alumnus, concerned with the welfare of the undergraduate, to pause, to listen, and to look. There will be no need to paint the lily.

THE original plan for a memorial to General Francis A. Walker contemplated the erection of a gymnasium which should bear his name. Funds were solicited for this purpose, the completing subscription being made by the Class of 1901 on the day of its gradua-

tion. Even at this time, however, it was obvious that Technology must seek a new site in the not far distant future and so no attempt was made to realize the Walker Memorial until this question was settled. In the years that intervened the sponsors of the plan and conservators of the fund became convinced that a student club house or activity center would serve better the underlying desire of a memorial than would the gymnasium first proposed. The consent of the original donors for this change was sought and received and plans for a Walker Memorial which should house the various student activities gradually began to take form.

At the time that the building came to erection in 1916, following the transfer of Technology to Cambridge, the Corporation found themselves faced with the necessity of housing certain definite services to the student body, and under the conditions then existing were constrained to modify the original plans so that the Walker Memorial might provide for all of them. In spite of a generous contribution from the Corporation to supplement the original fund, the resulting building at the time of its opening offered but limited facilities for the various student activities for the housing of which it was primarily intended. With the steady and normal growth of the various student enterprises, the overcrowding which was existent when the building first was opened became more and more apparent. As a result, in 1923, a committee of students and Alumni appointed severally from the two bodies, conducted an exhaustive study of the entire situation and ultimately rendered a report calling for a number of drastic changes in the arrangement of the building and allocation of the space therein. The general plan as submitted both to the Alumni and to the student body was approved and informally placed before the Corporation. For reasons which need not be entered into here, this latter body found itself unable to carry out the recommendations as indicated at that time, and definite action was postponed. Conditions, however, have become progressively worse and again this year student sentiment has awakened to the need of remodelling and re-apportioning Walker Memorial, and the sub-committee of the Institute Committee, which has prepared this study, has addressed a report to its parent body, to the Alumni Council, and now to the Alumni and students of the Institute.

The whole problem resolves itself into three major heads which can be briefly stated as follows:

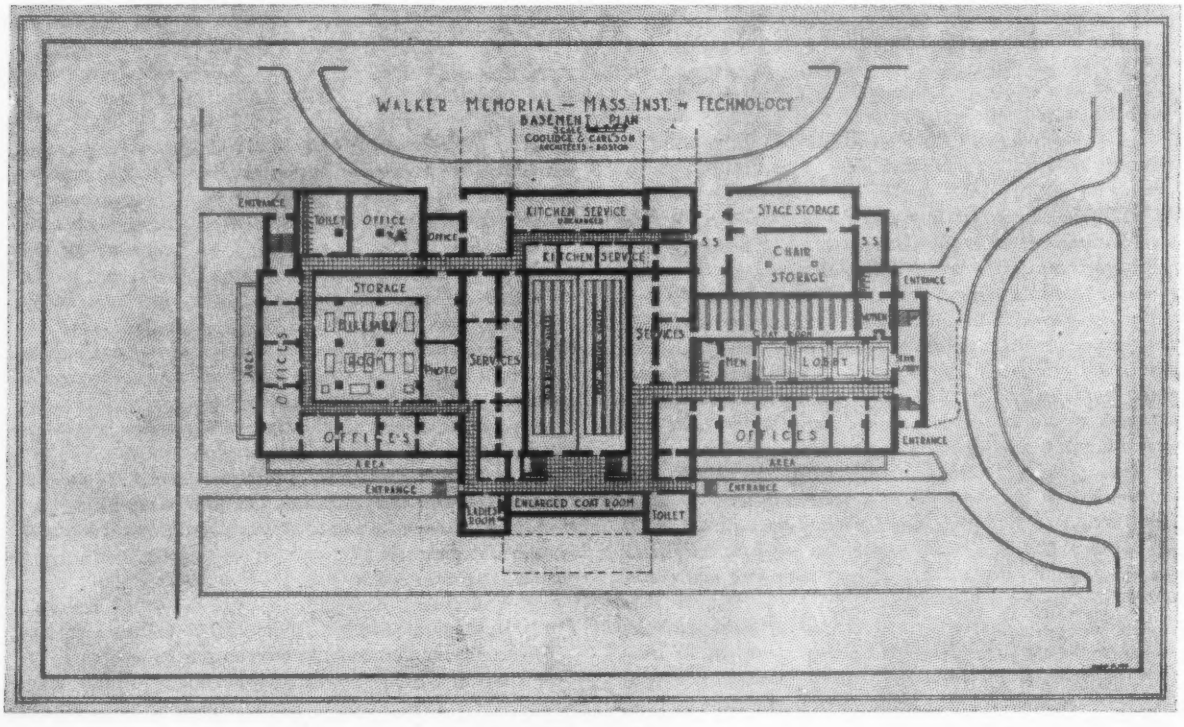
First, the removal of the dining service from the main hall and the refurnishing of that room as a general lounge.

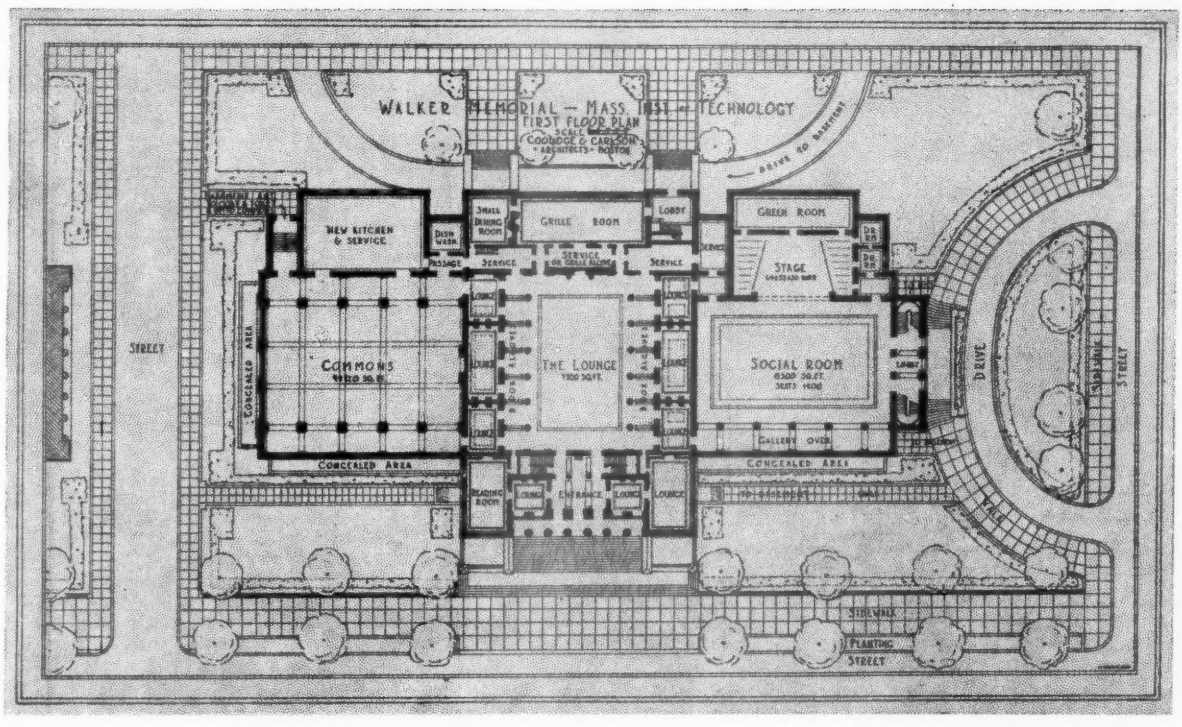
Second, the provision of a suitable auditorium for gatherings of Faculty, Alumni, and student bodies.

Third, the enlargement of the present accommodations for the various student activities.

The Main Hall — This room was designed for a lounge but it constitutes the only quarters available for a commons room, a banquet hall, and a ball room, purposes all of which it serves but indifferently. The dining service which operates a cafeteria in the hall with a seating capacity of 650, and in addition the Faculty Dining Room, the Grill Room and North Hall which together provide for some 400 more, is very badly cramped. The number of meals served daily is about 2200, and in addition to the regular service some 15,000 extra meals are provided during the year for organizations and clubs connected with Technology.

While the cafeteria will take care of 20 per minute, long "bread lines" form during the rush hours at lunch.





The kitchen, small and inefficient, is entirely inadequate for the demands made upon it. Not only is it not sound-proof, but odors often penetrate the Main Hall.

Present demands on the dining service overcrowd it, and there is no room for expansion. The minimum needs as estimated by the management are: a commons room which would accommodate 1000 people, faculty dining room and grill rooms twice the size of those now in use, a private dining room for conferences, a hall similar to North Hall to provide for 250 to 300 people, adequate kitchen facilities and a checking service to care for a capacity crowd.

The present student lounges in the Walker Memorial accommodate less than 3% of the enrollment. Further, this very limited space is seldom available, as a usual happening is for one or more of these to be cleared for the purpose of a committee meeting for which no other space is available. The committee of 1923, whose findings are presented in the thesis of Forrest G. Harmon, '23, stated that at that time students were evicted from the lounges on an average of 15 times a week.

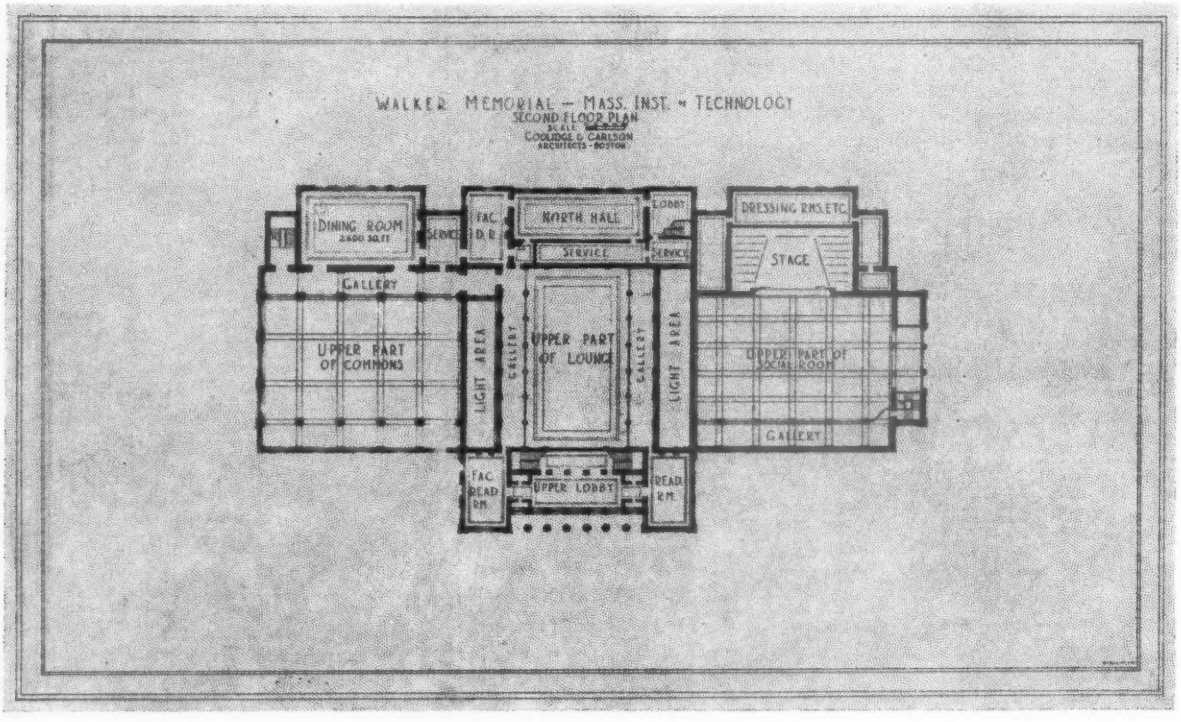
Another serious shortcoming in the present arrangement is a lack of adequate provision for the rapidly growing library made possible by funds from the Cilley bequest.

An Auditorium — At the present time Technology has no space at all adequate for housing lectures, assemblies, and other social gatherings for students, Faculty, and Alumni. While the educational building has certain large rooms for teaching they are but ill-adapted to any but conventional teaching needs. The Main Hall has been used for large banquets but with the inadequacy of the kitchen service it is not satisfactory for this purpose. Last fall the student body started a campaign with "Use Walker" as the slogan, thus signifying their wish that their own social affairs should be held in Institute property rather than in clubs and hotels in Boston. The response to this campaign has brought to the front the drawbacks of the terrazzo floor, undecorative furnishings, crowded checking space, and inefficient service of food.

At the present time the Drama Shop is conducting dramatic entertainments in the Commons Room of the Rogers Building where the seating capacity is about 100 and the stage no more than a recess with a width of 12 feet and no passage from side to side during a performance.

Under present conditions no large dinner meetings of students or Alumni are possible; the annual All-Technology smoker overtaxes the present facilities; a large alumni dinner could neither be seated nor served; there is no auditorium available other than the bare lecture room now used by the Physics Department for distinguished speakers or artists who might come to Technology. And the capacity here is less than 700 or a scant quarter of the student body.

Student Activities — The third large question in the general problem is concerned with the provision for the student activities which was the primary consideration of the committees in 1923. The situation in these offices reflects vividly the general overcrowding of the building. In some of the activities the allotment of space allows but three square feet per person were they all to assemble at once time, and as the cross section of the average standing man approaches two square feet and may exceed it, the inadequacy of the present accommodations to meet the current needs requires no elaboration.



The figures given above take into consideration only those activities which enjoy office space and include the four publications (*The Tech*, *Technique*, *VooDoo*, *and T. E. N.*), the Athletic Association, Tech Show, Musical Clubs, and the Christian Association. The Institute Committee, the Student Governing Body, and the committees for the Walker Memorial and Point System share jointly a magnificent apartment eleven by thirteen feet. No space whatever is provided for the 10 professional societies, the 10 clubs, and the 20 honorary societies.

The space available for all of the student activities is now about 3000 square feet. The individual offices are far too small for the daily work and any special meeting leads to a commandeering of one of the lounges, thus aggravating the congestion in the remainder unless they too have been commandeered. A conservative estimate of the needs of the present activities, with reasonable allowance for future expansion, indicates an area of some 12,000 square feet of four times the present allowance.

The Complete Solution — It is apparent that the plans, published herewith and prepared for the committee by Harry J. Carlson, '92, answer in every detail the needs as they have been stated. Not only will they provide a utilitarian structure but also one emphasizing architectural beauty throughout. Wings will be added on each side of the present building, with a beautiful entrance to the auditorium from Amherst Street.

The first floor plan (page 375) shows the proposed disposition of the dining service which now absorbs the Main Hall. A huge room of 14,000 square feet will occupy a large share of the West Wing, and behind it are kitchens of adequate size. Private dining rooms have been introduced; a grill occupies the present kitchen space; and North Hall and the Faculty Dining Rooms are left untouched and will function as at present.

With the Main Hall thus relieved of the dining service, it will be furnished as a lounge. "Conversational groupings" of furniture will cover the main floor, while the space under the balconies will be arranged as alcoves defined by bookshelves extending from the walls to the pillars and containing the books of the library. Each alcove will be furnished with comfortable chairs, reading lamps and tables, with possibly fireplaces to add the final touch to the congenial atmosphere.

As is shown in the basement plan (page 374), the activities have been amply provided with offices, each group being allotted adequate space. These rooms will have full length windows giving onto a concealed areaway, dispelling the gloom that now prevails in the present basement quarters. The rest of the basement will be given over to toilet facilities and checking rooms for men and women, and to needed enlargements of the game rooms.

The East Wing is the architectural masterpiece, an auditorium of which all Technology men will be proud. Like the Commons Room in the opposite wing, this room will be two stories high. With a stage 50 feet high, 64 feet wide, and 35 feet deep, and a seating capacity of 1400, the auditorium will take care of any group that is likely to come to Technology. Tech Show will find the auditorium the solution for its present problem, as well as an incentive for the highest type of production, for the wing is ideally equipped for dramatics. Beautifully appointed, this spacious assembly room may easily be transformed into a ball room comparable to that of any hotel, and with a direct connection to the lounge.

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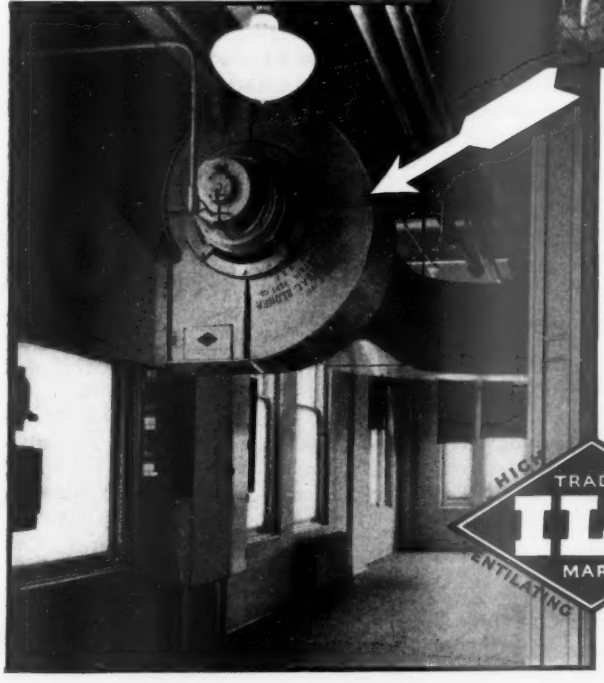

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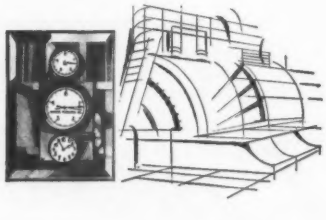

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IS HISTORY A SCIENCE?

(*Continued from page 344*)

a new term for a new thing. The problem, however, must be attacked from the point of view of method. That is the crux of the whole situation.

I do not wish to be dogmatic as to the nature of this new method. It will require a great deal of thought and the thought of a great many people. It will probably require many tentative experiments, some of which may appear ludicrous or fantastic to the old school historian. The work will be pioneer work in a new field. As such, unfortunately, it will not allure many under our present system. To work out a new method and experimentally put it into practice might prove the death blow of professorial ambitions whereas a new "standard" history or a monograph on the old and approved lines might spell another thousand a year salary. Nor, as a nation, are we much given to exploring untried fields of thought. The attempt, if it comes in America at all, will probably be made by some gifted amateur entirely disconnected from a faculty and a board of trustees, as was the case of Henry Adams, who, as I recently pointed out in *The Yale Review*, was the great pioneer in this possible reconstruction of method.

I will not here repeat what I said there but will merely make a few suggestions to end this article, which is itself merely a suggestion. For one thing, I think the new method will completely reverse a marked trend in the present one. True science is bound to tend as far as possible toward simplification. In the first place a very special field of research has to be delimited. In the second place the multitudinous data observable in that field have to be reduced to patterns, to laws. If, for example, mathematics dealt only with individual numbers from one to infinity we would have the infinite results of possible permutations and combinations but no science of mathematics. For this reason, I am inclined to look with a very unsympathetic eye upon all the efforts to complicate rather than to simplify the data with which the genuinely scientific historian would have to deal. We are told by one school of historians that the historian of the future must have a good working knowledge not only of the "history" of his period but of anthropology, psychology, psychiatry, physiology, medicine, and so on. In the first place no man can have a good knowledge, kept up to date, in all the fields this school suggests as essential. A little knowledge has always been a dangerous thing, and never more so than now when a scholar can scarcely keep up with the printed literature in even two languages of his specialty. A background of even moderate knowledge is useful to any one, and quite as much to the historian as to any one else, but a smattering of all these 'ologies is not going to make him more "scientific." The path toward that goal, it seems to me, lies in simplifying rather than in complicating the data with which he must deal.

As I said in *The Yale Review* I think that, for the reasons I there gave, Henry Adams failed in his effort to establish a new method, but I do think he was, in this respect of simplification, wholly on the right track. The school noted above would have us get history nearer to a science by complicating its data. For (*Concluded on page 382*)

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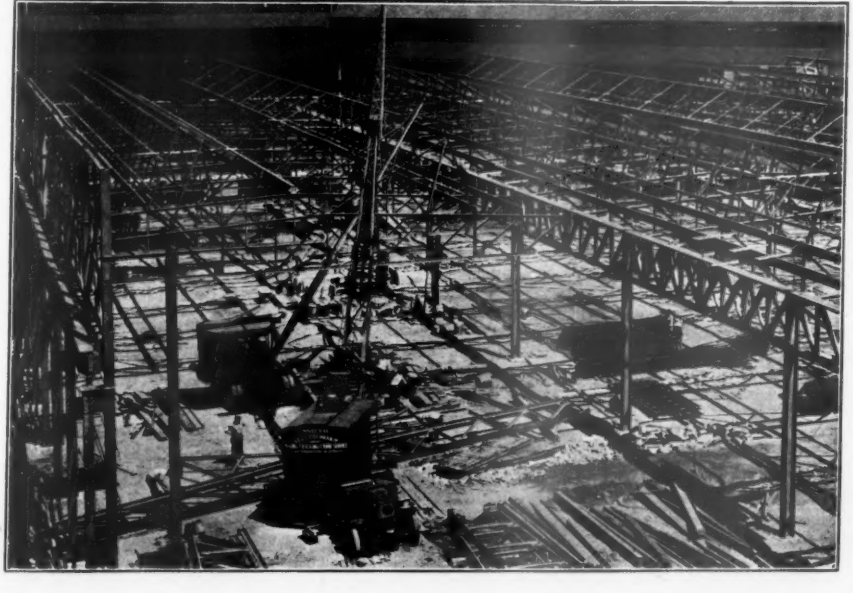

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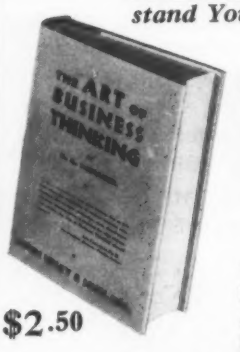

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IS HISTORY A SCIENCE?

(Concluded from page 380)

example, it would have us know all about epilepsy in order to be really scientific about Caesar or Napoleon, and so with other great men and other diseases. One great trouble with history already is that we cannot see the wood for the trees, and this school would have us paint every leaf. Such knowledge might be useful for the narrative school of history but I think it could only be detrimental for the scientific. Adams, on the other hand, and that was his great contribution, insisted that history must be de-personalized in order to bring its phenomena under laws and make its events predictable. If we are to attain to laws in history (and sociology) that shall be of any use in assisting us to modify or direct the social organism, they must be laws that have nothing to do with individuals. A vast modern society that can be thrown out of gear by somebody's fit of epilepsy is about as dependable as a dynamo that can be put out of order by a mosquito bite. The sciences that have built our modern material environment have not been based on that sort of individualizing. Nor can history and sociology if they are to keep pace with the physical sciences and be of any real use to us in guiding events. Narrative history of the accepted sort has its use in this, as in other respects, and the more it is written in the scientific spirit, and with the hand of art, the more useful it will be, but our social machinery, due to science, has become so vast and complicated that we need something more to guide us than the mere story book of the past.

It may be that there are no laws governing history and man's social life, that empires are mere whirls of cosmic dust obeying the laws of chance. If so, there is no hope for a science of history or for a rational ordering of social life. Man long thought the same about the powers of the physical universe but he studied them in the faith that they would be found to be governed by law and that knowledge of those laws would give him control over them. His faith was justified. A similar faith must be invoked in studying man himself and his institutions, and, just as in the physical sciences, a method applicable to the data must be devised. We cannot deduce laws from isolated cases. Every instant the present is merged into the past, and the historic past, short as it is, faultily recorded and cumbered with an immense amount of irrelevant personal detail, is our only storehouse of data, whether that past is of Woodrow Wilson or Alcibiades. To it we must go as the scientist to his laboratory. We have none other. The historian who is engaged in reporting it without fear and without favor is providing us with indispensable material but we must learn how to use it. We must develop a method of dealing with it, whether along the lines I suggested in *The Yale Review* or others better adapted to the purpose. The essential problem today of history as a science is the problem of method, and the man who, like Henry Adams, makes a tentative effort to solve it need expect no applause, but he will be contributing to that infinitesimally small but infinitely precious store of pure thought that eventually moves the world.

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THE NEW SWEDEN

(Continued from page 347)

the Kransfors Company. The modern sawmills center along the north Baltic shores, and they are turning out products with a value of nearly $100,000,000 per year. The production of lumber is not increasing at present. There was a time when the Swedish forests were cut, as they still are in this country, without much idea of conservation and reproduction. This time is long past, and scientific forestry with stabilization of output has replaced thoughtless destruction. It is aimed to replace by new plantations the areas cut over. There are now in the country more than 2.5 million acres of forests that have been raised by forest culture since 1905. Soviet competition seems to be the dark shadow hovering over the Swedish lumber industry.

Manufacturing Industries

Wood Pulp and Paper. Of considerable more importance is the wood pulp industry, which has developed in a remarkable manner in the last thirty years. The Swedish production of wood pulp is the third largest in the world following the United States and Canada and amounts to about 2,000,000 metric tons per year. Paper manufacturing is also carried on; in fact it is an ancient industry, the earliest paper mill in Sweden dating from 1573. The larger part of the wood pulp is, of course, exported. There are about 400 paper and wood pulp plants, the selling value of the product being well over $150,000,000. Naturally the wood pulp industry centers, like the lumbering, along the north Baltic coast of the country. Veneers and pressed boards and other products of the forests which will be rapidly developed during the next years.

Steel. A dozen internationally known plants make an exceptionally high grade steel from the pig iron of the country. They are mostly located in the central part, west and northwest of Stockholm. Steel is manufactured by the Bessemer process but largely by the open hearth process. A smaller amount is made by electric smelting. As to quantity the industry is not so impressive, but the quality is exceptional and known all over the world. It is noteworthy that the Gillette razor blades are largely made from Swedish steel. Bofors, Uddeholm, Domnarvet, Sanduiken are among the well-known steel plants.

Other Industries. It is perhaps not so surprising that on the basis of these excellent raw materials industries embracing various kinds of machinery should have been developed, but it is remarkable that their worth should have resulted in the world-wide distribution which has been accomplished. Agricultural machinery is manufactured to a value of $5,000,000. Machinery for wood working and pulp has a value of $4,000,000. Internal combustion motors, crude oil engines and Diesel motors, largely for the ship building industry, account for from $5,000,000 to $10,000,000, and they are manufactured in such far-famed shops as Bolinder's, the Göta Works, and the Penta Works. De Laval's steam and water turbines — Swedish inventions — are distributed widely. Another industry which has developed on an imposing scale is the manufacture of the De Laval separator for skimming milk. These machines are sold all over the world. Not long ago, I met an *(Continued on page 386)*

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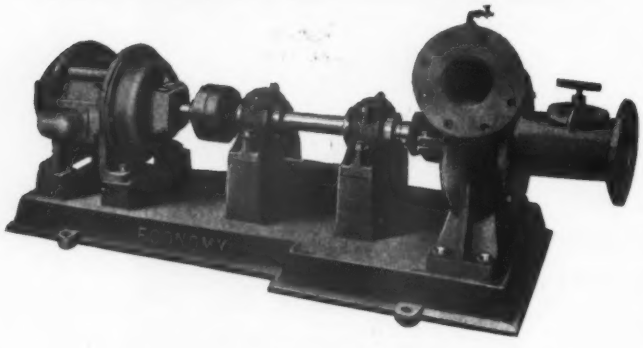

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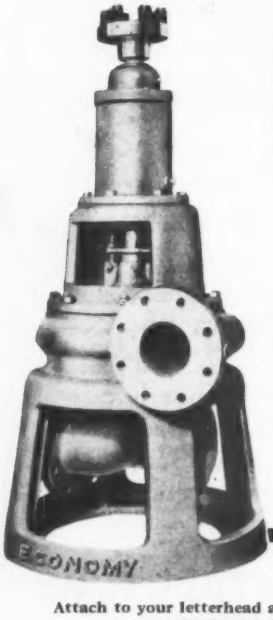

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THE NEW SWEDEN

(*Continued from page 384*)

agent of this concern in Peru, and I will say that cows are certainly not plentiful in that country. The annual value of separators is said to be nearly $10,000,000. The Swedish petroleum stoves, it seems, have proved most attractive in many lands and this little industry accounts for $2,000,000 in value of products.

Machine tools and metal working machinery do not occupy such a spectacular place as some of the other industries, but they have a well deserved fame. I might mention another invention, the Johannson precision gauge, which is also of international importance.

Bicycles do not seem to be a very vital mode of propulsion on this side of the sea, but in Sweden and on the continent, they are essential. The Swedish article dominates the local trade and has a wide export distribution. The annual value is about $6,000,000.

One cannot go far abroad without seeing the A. G. A. lights. The manufacture of these accumulators and automatic light signals for beacons, railways, cars, and steamers is an important item. They are based on the inventions of the Swede Dalen.

S.K.F. is another magic name, which is met all over the world; it stands for *Svenska Kullager Fabriken*, or Swedish ball bearings, the invention of another Swedish engineer named Wingquist. Exports go to all countries and have an annual value of about $6,000,000.

Westerås, a town not far west of Stockholm, is the headquarters for ASEA, a welcome abbreviation for *Allmänna Svenska Elektricitets Aktiebolaget*, the General Electric of Sweden. In vast plants all kinds of electric, particularly high tension, machinery is manufactured. It can be readily understood that with far-reaching electric development in the manufacture this should be a fairly busy concern. In fact, its products have an approximate value of $8,000,000 per year.

Swedish engineers have played an important part in electric inventions. Jonas Wenström constructed the first Swedish dynamo for direct current; and later in 1890 he obtained a patent for a three-phase motor and power transmission. The first power transmission line was built in 1893.

Foreigners who have had disastrous experiences in telephoning on the Continent are amazed at the surpassing efficiency of the Swedish system, which is operated by the Government. It is used even more than in the United States, particularly for long distance conversation. I remember my surprise in 1913 in finding that the telephones of *Telefon Aktiebolaget L. M. Erikson* were used in the City of Mexico. Since that time the fame of the Erikson phones have spread. You will find them in London, Paris, and Madrid, all over Mexico and South America; you find them in Turkey, in Cape Town, and in Australia. They represent one of the industrial triumphs of Swedish engineers.

The Match Industry. Swedish matches were first manufactured under a Swedish patent at Jönköping about 1858 and the little boxes with the mysterious inscription *Tända endast mot lädans plän* (ignite only against the side of the box) soon became known all over Europe. This industry alone deserves a long (*Continued on page 392*)

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THE NEW SWEDEN

(*Continued from page 386*)

chapter. Other factories were established in Sweden and elsewhere, but it was not until 1917 that it began to make real international history. About that time the entire match industry was amalgamated as a single concern which now has ramifications all over the world under the leadership of Ivar Kreuger.

The "match trust" now controls the manufacture not only in Sweden but in most other countries. I think it is true that the best matches still come from Sweden, but plants are located in Finland, Poland, the Baltic countries, and elsewhere. Its political importance has grown enormously; it has obtained monopolies in many countries; it has loaned vast sums to countries in need of money. Through the International Match Company it is said to control the production in the United States. It looks now as if increased duties would force the match trust to establish manufactories in this country.

At any rate the Swedish production still leads. We are told that the exports from Sweden alone amount to 46,000 metric tons (How many matches to the ton?), having a value of well over $10,000,000.

Miscellaneous Industries. I have touched only the high spots of Swedish commercial activity and particularly those of international interest. There are dozens of other industries, of course; for instance, the quarries and the cement plants, the glass and ceramic industry and the industrial arts industry. All these have an aggregate value of product of about $40,000,000. The porcelain of Rörstrand and the exquisite cut glass ware of Orrefors are well known. The important textile industry yields products with a selling value of over $100,000,000. Food and drinks, rubber, leather, and chemical industries produce their large share.

All in all it is a creditable exhibit, well comparable to the best results accomplished elsewhere. It shows what can be done by the efficient combination of engineers, scientists, and financiers, and a determination to utilize to the utmost, and at the same time conserve, the natural resources.

Shipping. Hardly a ton moves out of the country, except by water. The Swedes are a race of seafaring people, and like the other Scandinavians have developed a large mercantile marine, which carries the imports and exports over the seven seas. Sweden has a total gross tonnage of about 1,500,000. Eight or ten large overseas shipping companies carry the trade to all important points in the Americas, Asia, Africa, and Australia. A line of passenger liners equal to the best (*Svenska Amerika Linien*) connects Gothenburg with New York.

Consumption of Alcoholic Drinks. Since the time of the convivial gods of heathen Scandinavia, drinking and fighting have ever been the bane of the Nordic people. The fighting, of course, has subsided. I think it may be said that in spite of some recent increase in crime the population is extremely law-abiding. It was stated recently that three murders were committed in 1929; this compares favorably with Chicago.

Many people are interested in the attempts to control the evils of excessive drinking and perhaps a few words on this subject will not be amiss.(*Concluded on page 394*)

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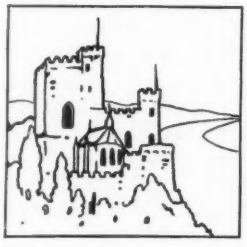

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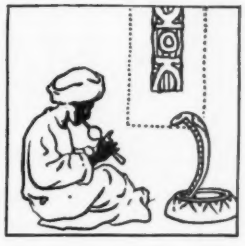

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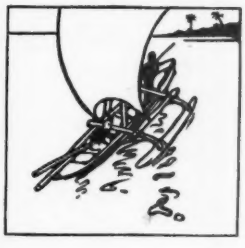

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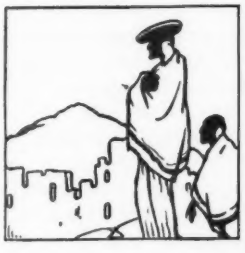

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THE NEW SWEDEN

(Concluded from page 392)

I knew well the situation about 1870 to 1880, and frankly, it was bad. Drunkenness was common and the almost unrestrained production of brandy (*brännvin*) from grain and potatoes produced deplorable results.

At the present time the conditions are vastly improved. During two weeks in Stockholm I saw exceedingly few intoxicated persons. Since 1890 there has existed a strong movement for prohibition and no doubt at the present time about half of the population favor it. A plebiscite in 1922 gave a majority of 43,000 votes against total prohibition. At the present time Finland is the only one of the northern countries in which prohibition exists and, if newspaper reports are to be relied on, the conditions there are extremely grave and not very different from those prevailing in the United States at the present time.

About 20 years ago when it became clear that something must be done to control the excessive misuse of alcoholic drinks, the system of Dr. Ivar Bratt was introduced which, with modifications, still exists. Beverages containing less than 3½% by volume of alcohol are considered non-intoxicating and are freely sold. The most common drink in the restaurants is half a bottle of such beer. Beverages containing more than 3½% can only be bought from the shops of the system which are controlled by a single company. Government representatives are in the majority on the Board of Directors and the share holders receive only a limited interest on the capital. There is also a State Control Board to supervise the traffic. Beverages containing more than 22% by volume of alcohol are limited to a certain maximum amount which may not be more than four liters per month, but this only to one person in a family. In most cases the amount allowed is only two liters per month, and no *Motbok* (control book) can be issued to any person below twenty-one years of age, I believe. The book is only good at one distributing shop.

In restaurants a strictly limited amount of wine and liquor may be consumed with the food. The open saloon is non-existent. Temperance committees in each community supervise plain abuse of drinks. The *Motbok* may be taken away or an individual failing to provide for his family or dangerous to the community may be detained in a public institution according to the law of 1916.

The system may not be perfect, but it seems to work very well indeed and is approved by the people. I find in the Yearbook the statement that there were 45,972 arrests for drunkenness in the country in 1920, which number in 1926 was reduced to 29,438, equivalent to 0.5% of the population.

I have ventured to place before you this brief story of the recent industrial development of a country not rich nor populous but with the determination of doing the best that can be done with its resources. It seems to me that besides its general human interest, the story points to some dangers of industrialization which are parallel to those which confront us and that it also contains some lessons which we may do well to take to heart.

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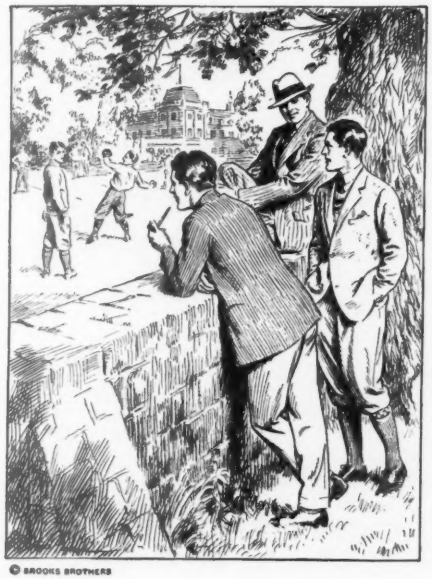

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A TOWN FOR THE MOTOR AGE

(*Continued from page 351*)

the same safety they can play in the park adjacent to their home or join in sports at the big playfield near the school.

The greater part of two super-blocks has been completed in accordance with this plan and about 160 families are living there. It is too soon to say that the new street plan is 100% efficient as a traffic safety device, but already the experiment has gone far enough to justify optimism.

In its business sections, still largely at the planning stage, Radburn follows more closely the general lines of the gridiron system but with important innovations and improvements which are expected to obviate its shortcomings. Road areas will be generous enough to permit a wide, central lane for fast-moving through traffic with separate side roads giving access to shops and offices and providing for short stops. Parking for longer periods will be provided in the center of the block, a sort of hollow square formed by the business buildings and all loading and unloading of goods will take place at platforms on this side.

Plans for the business section are comprehensive, since Radburn is designed not merely as a dormitory suburb for New York but rather in the nature of a satellite town with its own commercial and industrial sections, and at least a part of its population living near its work. In this sense it is one of the first experiments in the direction of the regionally planned growth of the New York area and the decentralization of some of its industry and business as well as population.

Big city crowding is evident nowhere so much as in the lack of adequate, healthful, housing accommodations for that great bulk of the population which may be classified as the families of moderate income. Ordinarily the homes available to them offer a choice between a cramped apartment tucked away in some bleak structure, or individual houses, but little larger, standing shoulder to shoulder in identical rows in some equally bleak suburb on the fringe of the city. In either case the opportunities for making a family home are few; light and air are at a premium and no provision whatever is to be found for children's play.

Wasteful planning directed more toward the creation of real estate values than the economic utilization of land, plus wasteful construction in small units and the absence of technical skill in design are largely responsible. To these must be added the very substantial item of high financing costs incident to so completely speculative an industry as the production of moderate priced homes and apartments.

In such a situation it is not surprising that the whole question of planning and building moderate priced homes and communities has made little if any progress. The use of skilled technicians and research are confined in all industries to the large producing units, and the home building industry, although it bulks big among the business activities of the country, is made up almost entirely of small individual units. The individual builder is usually unable to afford skilled architects and such things as research or a scientific approach to his problem are just so many words. He hasn't the slightest (*Continued on page 398*)

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A TOWN FOR THE MOTOR AGE

(*Continued from page 396*)

inclination to experiment, but on the contrary is eager to repeat designs and arrangements which for one reason or another have proved popular and sold or rented readily.

The City Housing Corporation of New York, which is building Radburn, approaches the problem from an entirely different angle. It was organized by men who sensed the civic and social need for a scientific attack on the problem of providing better homes and better communities.

Before undertaking the Radburn experiment, the company completed the building of Sunnyside Gardens, a model community in Queens, New York City, where its plans for a scientific approach to problems of community and home building, large scale operation and the use of the best technical skill were tested. In little more than four years it built a community which now has a population of about 5,000. The ready sale of the Sunnyside houses, their quality, character, moderate price, and above all, the garden environment created within 15 minutes of the heart of the city give a fair index of the experiment's success. Because of the rigid requirements of the City of New York's official street plan, there was little latitude possible in this respect in designing Sunnyside. Nevertheless the planners, headed by Clarence S. Stein, former Chairman of the New York State Committee for Housing and Regional Planning, and Henry Wright, former Chairman of the American Institute of Architect's committee on community planning, found it possible to break away from the traditional treatment of back yard areas and substitute for them pleasant community gardens and play space for children. Another innovation was the setting aside of a three-and-a-half-acre park for residents, an advantage enjoyed by few sections of the greater city, even the most expensive.

In the planning of Radburn, Mr. Stein and Mr. Wright have associated as consultants Frederick L. Ackerman, during the War, Chief of Design, Housing and Town Planning Division, United States (*Continued on page 400*)

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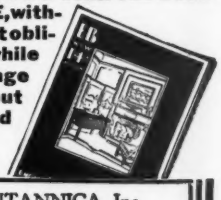

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A TOWN FOR THE MOTOR AGE

(Continued from page 398)

Shipping Board; Robert D. Kohn, during the War, Chief of Production, Housing and Town Planning Division, United States Shipping Board; Thomas Adams, formerly Director, Regional Plan of New York and Environs, Russell Sage Foundation; and Raymond Unwin, technical expert for the Greater London Regional Planning Committee, and President of the International Federation for Housing and Town Planning.

UP to this point our interest in Radburn, Sunnyside Gardens and the work of City Housing Corporation has concerned itself chiefly with the physical side of home and community building; comprehensive planning for homes, business, industry, recreation, and the application of large scale production methods to the work of construction. But Sunnyside and Radburn are more than so many houses on so many acres of land, more than experiments in community building no matter how significant. They are social entities where men, women and children live more healthfully, more pleasantly and more completely than is possible for most families in moderate circumstances in and about a great city like New York.

At Radburn the residents have a common interest in considerable community property. In some eight or ten years from now when the town is completed there will be a total of about 180 acres of park land and much other property used by the community and administered in its interest. The community property at Radburn has been deeded to a non-profit membership corporation created for the purpose and called the Radburn Association, consisting at this time of officers of City Housing Corporation and representative civic leaders of Northern New Jersey. As the community takes form and is better able to function as a group, it is planned to turn the powers and duties of the Radburn Association over to the residents.

In addition to holding title to the community property, the Radburn Association is clothed with power to enforce architectural and other restrictions and to perform necessary community services which are not yet furnished by the semi-rural borough of Fair Lawn, of which Radburn is politically a part. Thus the Radburn Association operates a sanitary and storm sewer system, supplements the waste collection, police, and fire service supplied by the borough and employs a recreation director to supervise playground activities.

At Radburn, again the common interest of residents in parks and other community facilities has resulted in the formation of a community organization known in this instance as the Citizens' Association. This association, operating through some 15 committees, already has sponsored some lively community activities. It has set up a health center with a physician and nurse in charge; it has provided a visiting bedside nursing service; it has established a small circulating library; it is developing groups for recreation both indoors and out; it has set up the Radburn Players in the field of drama; it has provided a Children's House with kinder- *(Continued on page 402)*

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A TOWN FOR THE MOTOR AGE

(*Continued from page 400*)

garten equipment and facilities for a nursery school and the teaching of handicraft; it has provided for loan exhibitions of art and has under way many other projects for community activity.

THE financing of the Radburn project is noteworthy, for many similar civic developments have been proposed, but always they have imploded when subjected to economic tests. The City Housing Corporation was incorporated in 1924 under a New York State Charter which limits the dividends on its capital stock to 6%. Alexander M. Bing is President and other directors include Dr. Felix Adler, John G. Agar, Leo S. Bing, William Sloane Coffin, Johnston de Forest, Thomas C. Desmond, '09 Mrs. Lucius R. Eastman, Douglas L. Elliman, Professor Richard T. Ely, Arthur Lehman, Frank Lord, V. Everit Macy, John Martin, Mrs. Joseph M. Proskauer, and Robert E. Simon.

The principal officers and the directors of the City Housing Corporation serve without salary and dividends on the stock (which have been paid regularly since the incorporation of the company) are limited to 6%. In other respects, however, the City Housing Corporation is managed like any other business corporation and its financial success proves that American cities can secure better housing for people of moderate means, on a 6% basis, if they only will.

Up to the spring of 1930, the Corporation has spent on site purchases and construction work nearly thirteen million dollars. About half of this sum has been obtained on ordinary real estate first mortgages from trust companies and insurance companies. The much more difficult equity capital has been obtained by the sale to nearly 650 individuals interested in better housing of approximately $2,700,000 City Housing Corporation 6% limited dividend stock, $2,000,000 second mortgage collateral trust 6% bonds, and $2,325,000 6% Radburn notes. All of the securities have been sold at par, directly by the company, without underwriting or commission profits to anyone, and the same policy will be followed in regard to the additional capital which is now being sought for the completion of Radburn.

Design and construction on the large scale of the City Housing Corporation of course result in quality at a low cost. The company is aiming to show what modern and efficient business methods can do, when applied to the small house problem. The financial strength of the company and the moderate returns accepted by investors in its securities (with none of the high interest charges and commissions which are the bane of ordinary small house second mortgage financing), of course make possible very easy financial terms for the home purchasers. The City Housing Corporation sells houses with only a 10% payment down, and monthly payments, like rent, extending over periods as long as 15 years.

The average commercial builder has little interest in a safety traffic scheme or a new park system, but he is interested in the fact that the Radburn super-block plan requires less land for streets, less (*Concluded on page 404*)

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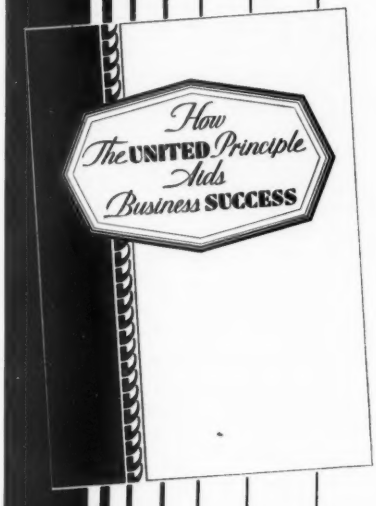

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A TOWN FOR THE MOTOR AGE

(Concluded from page 402)

paving, shortening of all the utility lines such as sewers, gas and water. He will be interested in safety streets and parks perhaps because his prospective customers demand them, but the prospect of saving on land, paving, and utility costs has to him an immediate appeal. Perhaps this is why Radburn has already been visited and its plans studied by real estate developers from 20 different cities in the United States and its basic planning scheme has been adopted for several new suburban developments, one near Buffalo, N. Y., one near Miami, Fla., one near Chicago, Ill., and another near South Bend, Ind. The list is not a long one, but Radburn is still only a little more than a year old. The experiment continues. As the new town grows it should demonstrate with increasing force and clarity the value of town building by plan under the guidance of civic spirited and philanthropically-minded business men and investors competently aided by intelligent architects, engineers, and contractors.

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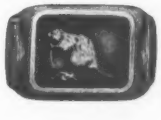

TOP VIEW

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INSTITUTE GAZETTE

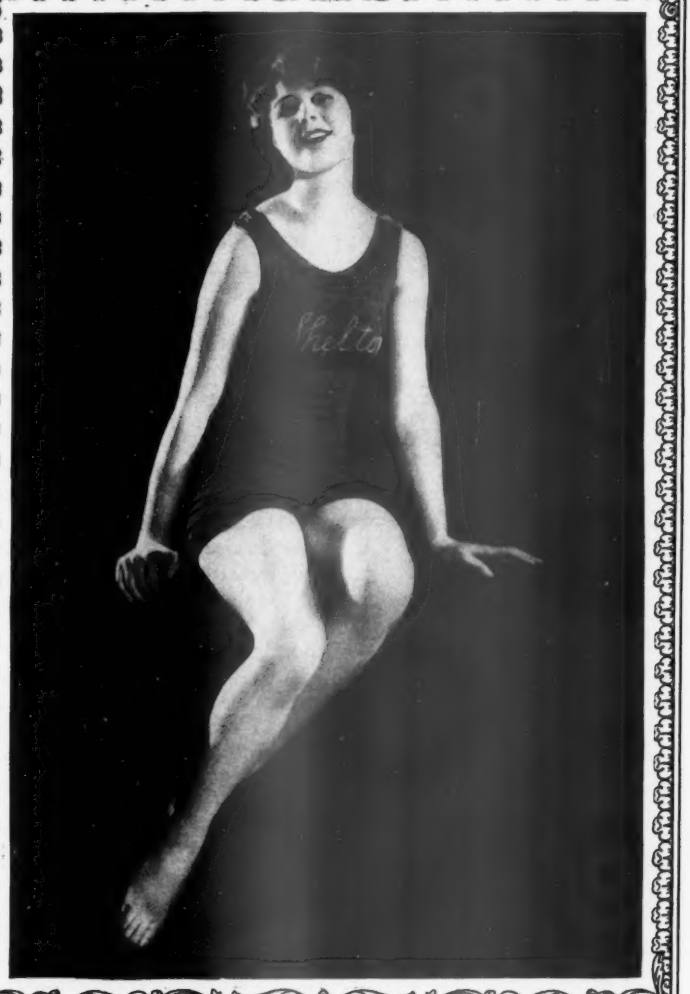
(Continued from page 369)

ground in December, 1906, and the firm was employed to design and superintend its rebuilding. This was the beginning of an extensive engineering practice in factory design among food specialty packers in this and other countries. A substantial part of the practice of the firm was concerned with the design and practical development of special machines and devices to which Tripp devoted his keen inventive ability and sound engineering training. Among these may be mentioned a wire fence loom, a pneumatic street sweeper, and auto-cultivator, a coal briquetting press, a perforated card tabulating machine, and an automatic corn popping machine. The last named device, brought as a crude, undeveloped idea to McMeans and Tripp, was perfected and designed in practical operating form in 1913 for the Holcomb and Hoke Manufacturing Company who acquired the rights under the patent and who have since manufactured the device in very large quantities, distributing it throughout the United States. Much of Tripp's time and attention was given to the manufacturing and improvement of this machine during 1916, and on March 1, 1917, he resigned his connection with McMeans and Tripp to accept the position of engineer and manager of the Holcomb and Hoke plant at Indianapolis.

Immediately after this our country entered the World War and this change in business connection led Tripp into a field of activity doubtless very different from that which he had foreseen. As factory manager for the Holcomb and Hoke Manufacturing Company, he soon found himself engaged in the production of rifle grenades for the United States Army and he became Secretary of the Rifle Grenade Manufacturer's Association. This work brought him in contact with powder manufacturers, and in 1918 he went to Wilmington, Del., to become associated with Ernest du Pont and others in the Ball Grain Explosives Company. As plant manager of this company, he was engaged in loading rifle grenades and in the development of a flashless cannon powder for the United States Navy. Although trained as an electrical engineer, his activities henceforth were to be largely in the field of chemical engineering. His success in this new direction demonstrates the fact that a Technology man, thoroughly grounded in any one of the Institute's engineering courses, can, by his own efforts, succeed in the field of another.

Research in, and the manufacture of, explosives constituted Tripp's professional work for the remainder of his life. The Ball Grain Explosives Company was succeeded by the United States Flashless Powder Company in which Tripp continued his association with Ernest du Pont and of which company he was Secretary-Treasurer. This company, to which Tripp devoted his energies henceforth is engaged in the manufacture of flashless military powder.

Born with an inventive mind, Tripp was always looking for a short cut for accomplishing whatever came to his attention in connection with his work. He took out forty or more patents for inventions covering a remarkably wide field. Perhaps the most valuable of these was that of the Tripp tabulating machine in 1915. In this machine, by means of punched cards, a vast amount of data may be recorded, tabulated, and *(Concluded on page 410)*



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INSTITUTE GAZETTE

(*Concluded from page 408*)

totaled. Tabulation machines had been in use prior to Tripp's invention but they required much manual manipulation in their operation. Tripp's invention was a notable improvement over previous machines in that its action is wholly automatic, thus eliminating the necessity of any manual operation, greatly increasing the speed, and reducing operating cost.

Tripp had all of the ingenuity attributable to the traditional Yankee. With his sound Technology engineering background, his keen mechanical mind brought useful results in practically every field upon which it came to be focussed. But besides sound technical accomplishments and ingenuity, he had much more, viz., a strong and sound character. The combination of these attributes and his universally friendly coöperative spirit, his conscientiousness and his persistent industry made him a dominant factor in everything which he undertook. And with these attributes he had great modesty. So that among all those who are now left behind doubtless there is not one who has not kindly memories of Tripp, nor one who does not sincerely mourn his loss.

Throughout his life, Tripp was keenly interested in the welfare and the development of Technology and he was deeply appreciative of the fact that the sound training which Technology gave him was the foundation upon which he built his successful career. Although absence from Boston prevented him from frequent attendance at Institute and class gatherings, he came to these whenever opportunity offered. A few years ago he consulted a classmate as to the manner in which, and for what purposes, a bequest could be made that would be most useful to the Institute. Possibly as a result of the suggestion thus offered, he made a bequest of $100,000 to the Institute in his will. The clause providing for this bequest is of interest because, while clearly expressing the desire of the donor as to its application, it recognizes that by the time it reaches the Institute circumstances may have changed so that other use might then preferably be made of the money. By the terms of his will his estate is held in trust during the lifetime of Mrs. Tripp, after which the trustee is directed "To pay over the sum of One Hundred Thousand Dollars ($100,000), absolutely and free and discharged from any trust, unto the Massachusetts Institute of Technology, a corporation of the State of Massachusetts. The corporation is requested to use this amount for dormitory construction, but may make such other use of it, or any part, as may seem advisable to them, after the bequest becomes available."

The last 12 years of his life were spent in Wilmington, Del., where he made his home at 2003 Van Buren Street, although at the time of his death he was preparing to move to a new home recently purchased in Wawaset Park. He was an active member of the First Unitarian Church of Wilmington.

For several years he had suffered from anemia. Two days before his death a throat ailment developed and with this added complication he sank rapidly. Tripp's first wife died in 1902, shortly after their marriage. In 1904 he married Miss Elizabeth Minton Wright. Mrs. Tripp and a sister, Miss Mabel K. Tripp, survive him.

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REUNION BULLETIN

(*Concluded from page 372*)

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Final Instructions

WITH this issue the *Reunion Bulletin* concludes its work of disseminating information about the great gathering in June. All ticket applications, to be filled in the order of receipt, should be addressed to the registration committee, Room 3-106, M. I. T., Cambridge, Mass. Complete instructions about registration and reservations will be included with the registration material which is to be mailed out the middle of May by George T. Welch, '21, in charge of registration.

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THE TABULAR VIEW

PROFESSOR L. MAGRUDER PASSANO is of that choice and fortunate group, the Carrollites, the members of which have discovered solutions for most of life's insoluble problems clearly set forth in "Alice in Wonderland." It is typical, therefore, that he should begin a paper on such a perplexing subject as Time by referring to the illuminating discourse on that subject which took place at the Mad Tea Party. It was then, you will remember, that the Mad Hatter removed time from the neuter gender and definitely placed it in the masculine. But the subject of time, as Professor Passano remarks in his paper, is not one to be treated frivolously, and he demonstrates that any definition of it must satisfy both the mathematicians and the philosophers. ¶ By way of parenthesis, we raise the question as to what the Mad Hatter would think of Einstein's latest contention that space has become carnivorous, devouring matter, and that time is after all not so important, be it an *it* or a *he*.

CHARLES D. CHILDS is manager of the Print Department of Goodspeed's Book Shop and, therefore, pretty thoroughly acquainted with the amenities of print collecting as well as prints themselves. In response to a letter from The Review earnestly soliciting biographical information, he wrote: "Various articles of mine, mostly short, have been published in the *Print Connoisseur*, *American Forests and Forest Life*, *Boston Transcript*, and so on, and a monograph, 'Samuel Chamberlain ['18]: Etcher and Lithographer' published by Goodspeed's Book Shop. As a hobby, I have amused myself with etching and drypoint and have published a few small plates quite recently. I was born in August, 1905, in Needham, Mass., and hope that no obituary notice will be posted for some time to come." It is particularly appropriate that Mr. Childs be introduced to Review readers because of the assistance and advice he has lent the Editors during the last several years in the selection of subjects for the covers of the magazine.

EARLE BUCKINGHAM, who presents the results of some of his research at the Institute, has had a varied career in the field of mechanical engineering, beginning at the United States Naval Academy in 1906. Since 1925, he has been Associate Professor of Engineering Standards and Measurements at the Institute. He is the author of "Principles of Interchangeable Manufacturing," 1921, and "Involute Spur Gears," 1922.

PROFESSOR ROBERT E. ROGERS needs no introduction anywhere in the world. Institute Alumni will be expecting his article on Page 441, for he has unfailingly lent a hand in reporting Alumni reunions and assemblies. ¶ HANS MÜLLER, who prepared the review on Page 444 is one of the Institute's young physicists. He was born in 1900 at Amriswil, Switzerland, and received a diploma in engineering from the Technische Hochschule of Zurich in 1923, and the degree of D. Sc. in 1928. At the present time he is Assistant Professor in the Department of Physics.

(*Concluded on page 420*)

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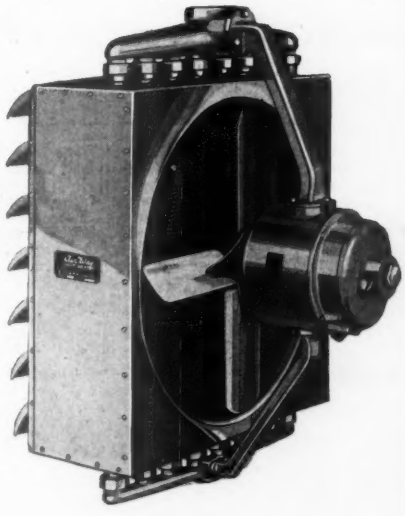

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THE TABULAR VIEW

(Concluded from page 418)

SINCE 1922 The Review has been published eight times per year and the present number concludes Volume XXXII. Hereafter, there will be nine numbers per year, the extra issue being dated October. Diligent readers of that issue will note on its masthead that the magazine has a new Editor, J. RHYNE KILLIAN, JR., '26; to less punctilious readers, however, this change may not be perceptible, for Mr. Killian, as Managing Editor of The Review since 1927, has been responsible for the editorial content and make-up of the last three Volumes.

Mr. Killian becomes the seventh Editor since Volume I, Number 1, dated January, 1899, made its bow on December 20, 1898, as a quarterly magazine. In format the initial number was of the so-called standard size (6½" x 9½"), printed on real rag paper with tipped in half tones and photogravures, all wrapped in a sombre brown covering.

To the Association of Class Secretaries, The Review owed its genesis, and the three men who planned it were: ARTHUR D. LITTLE, '85; C. FRANK ALLEN, '72; and the late JAMES P. MUNROE, '82. Mrs. WILLIAM BARTON ROGERS advanced them $1,000 as a guarantee fund, they appointed ARTHUR T. HOPKINS, '97, as Editor, and The Review became an actuality.

After three numbers, Mr. Hopkins resigned; WALTER HUMPHREYS, '97, now Secretary of the Corporation, was Editor of the number dated October, 1899, and, with the beginning of Volume II, Mr. Munroe undertook control. For eight years Mr. Munroe labored until, in 1908, he transferred the responsibility to ISAAC W. LITCHFIELD, '85, who served until 1917 when Robert E. Rogers became Editor. HAROLD E. LOBDELL, '17, succeeded Professor Rogers in 1922 at which time ERIC F. HODGINS, '22, became Managing Editor, being succeeded by Mr. Killian in 1927.

Besides Mr. Killian, the staff of The Review, Volume XXXIII, will include RALPH T. JOPE, '28, as Business Manager, and JOHN J. ROWLANDS as Contributing Editor. Mr. Jope has been with the magazine since 1928, and Mr. Rowlands, since 1925. Mr. Lobdell will continue with The Review as Publisher.

The Review regrets that Miss CATHERINE C. CARLSON, a member of the staff since 1926 and Editorial Associate of Volume XXXII, has resigned, but congratulates both Miss Carlson and Mr. Hodgins on their approaching marriage.

H. E. L.

THE REVIEW is not published during the summer months following July. This issue concludes Volume XXXII. Number 1 of Volume XXXIII, which will contain nine instead of eight numbers, will be published on September 27, and dated October. Readers who bind their copies of The Review are reminded that if they possess eight numbers of Volume XXXII, their files are complete. An index to the Volume will be ready on September 15, and will be supplied post-free upon request. Verbium sat sapienti!

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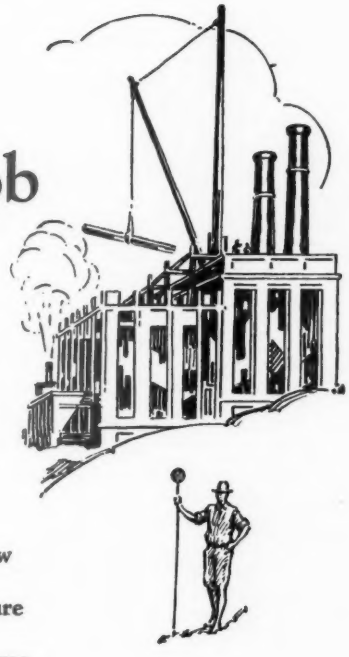

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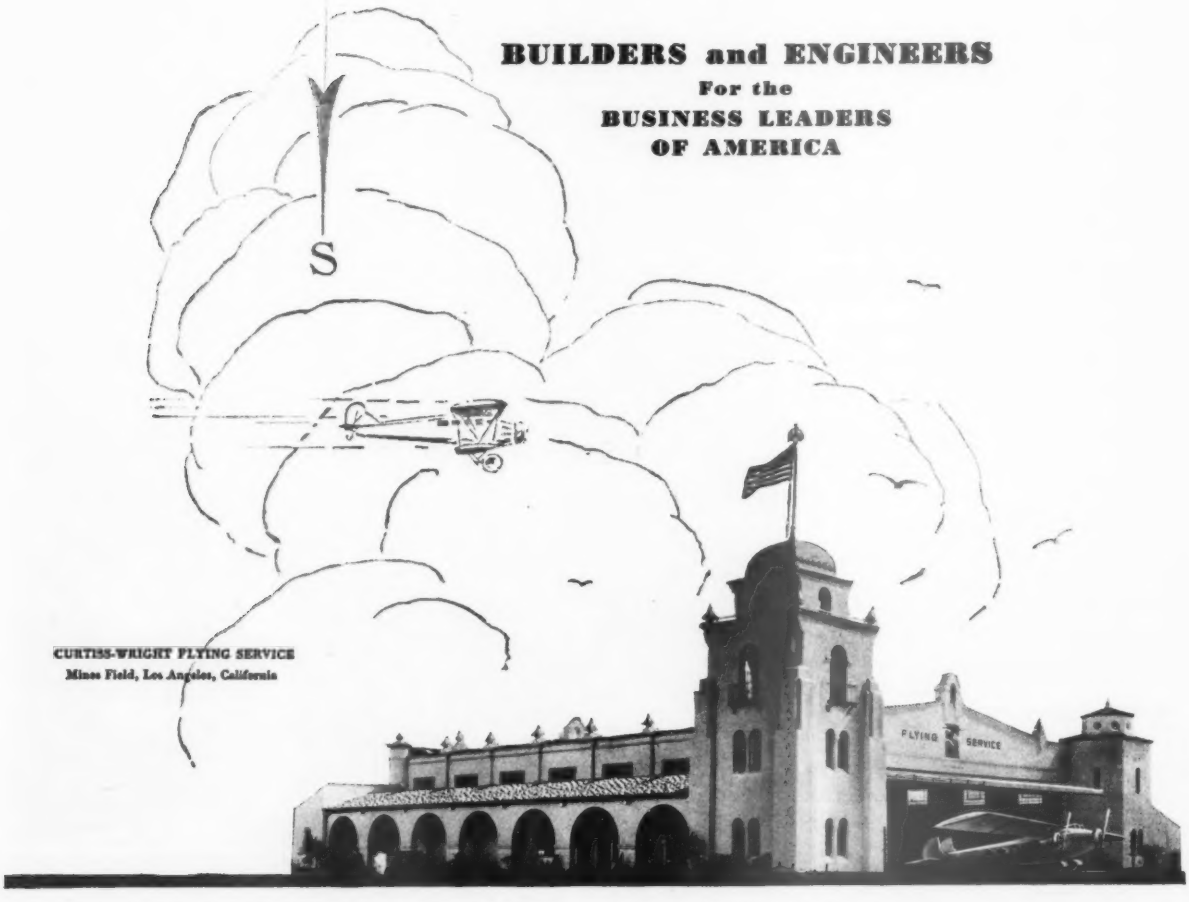

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